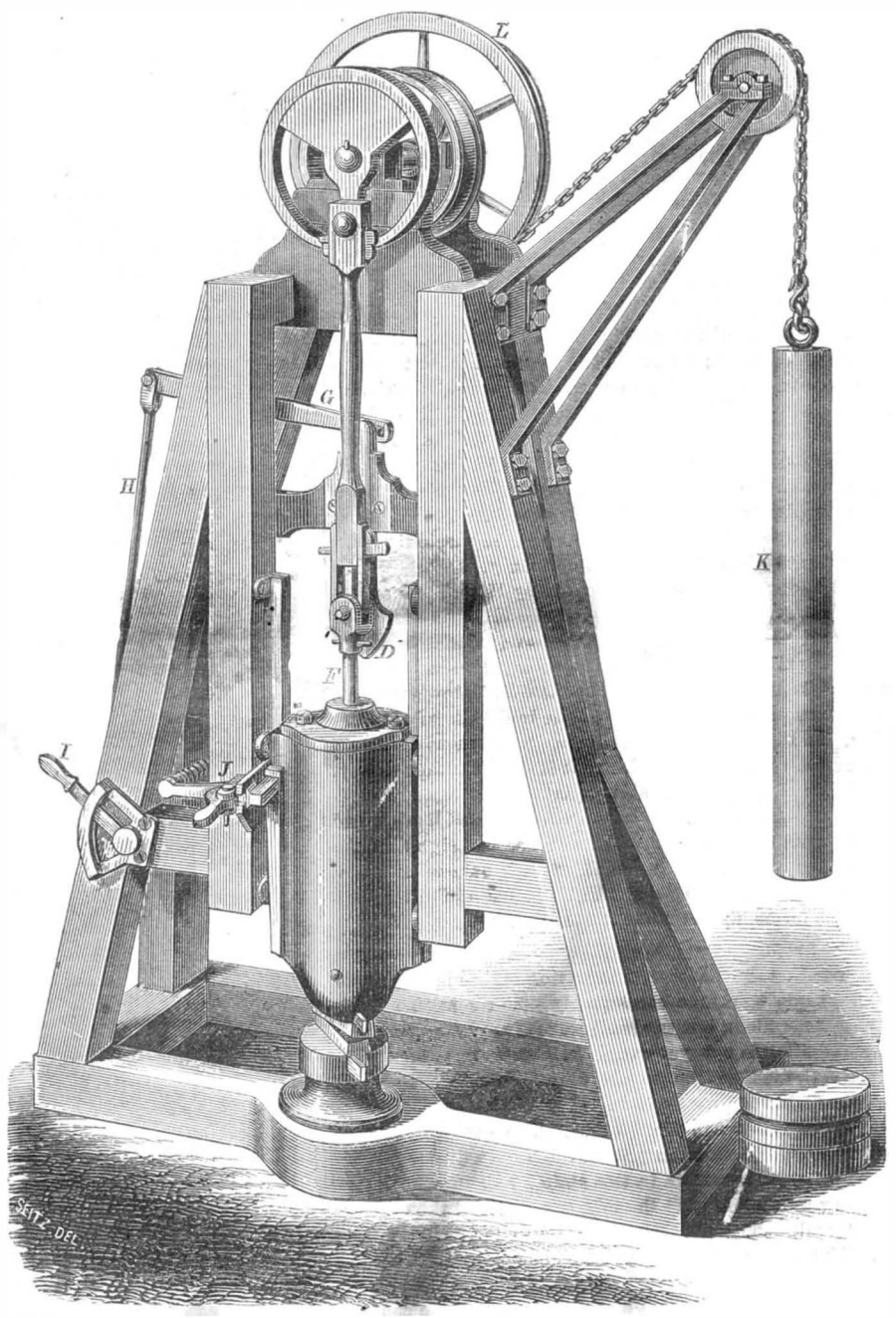
SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES

Vol. XIX.---No. 11. [NEW SERIES.] NEW YORK, SEPTEMBER 9, 1868. $3 per Annum. [IN ADVANCE.]

Improved Vertical Trip Hammer.

The old fashioned lever trip hammer, the use of which is beyond the memory of the "oldest inhabitant," is being superseded by direct stroke hammers, occupying far less space and performing their work much more satisfactorily. It is well known that the ordinary trip does not deliver a square blow except on a thin piece of work, and that its variation of stroke is confined, mainly, to a diminution in the number per minute, rather than to the amount of force exerted; so that for light work a light hammer must be used, and *vice versa*. The steam hammer is the master-piece of improved dead stroke hammers for heavy work, but it is expensive and not applicable to general work. Between this and the old style trip hammer there are several other devices which, sharing in the advantages of the great steam hammer, possess all the merits of the trip with some marked superiorities. The one shown in the accompanying engravings depends for the force of the blow wholly upon gravitation—the weight of the hammer—yet it may be so governed as to strike a much lighter blow than its total weight would deliver.



TANDLER'S DRAWING AND UPSETTING POWER HAMMER.

The hammer and actuating machinery is mounted upon a suitable upright frame of wood, or iron, the hammer-head being hollow, as seen plainly in the section, Fig. 2, and traversing in upright slides, by means of a crank and pitman. The drop, an internal arrangement of the hammer head, is shown in Fig. 2. Two bars, pivoted at A, extend up through the cap of the hammer-head, as at B, and are held together by spiral or other springs, C, until forced apart by the rise of the hammer bringing the projections in contact with the V-shaped releaser, D, Fig. 1, which spreads the bars and releases the cross head or snug, E, Fig. 2, which is attached to the piston rod, F. This cross-head engages with the bars or levers by means of projections seen plainly in Fig. 2. The hight from which the hammer falls, and, in a measure, the weight of the blow, are governed by the hight of the releaser, which may be elevated or depressed by the lever, G; rod, H, and handle, I.

Further, to govern the force of the blow, one side of the hammer has inclines against which two spring clamps, J, operated by a handle, bear with any degree of pressure desirable, and they may be regulated by hand or foot as may be most convenient. From the foregoing description the action of this hammer may be easily understood.

Attached to the hammer-frame is a device for "upsetting" a shaft or heavy bar of iron, K, which is suspended by a wire rope or chain running over a sheave and around a grooved wheel, L, the groove of which runs out at the side on one part of its periphery, allowing the bar to drop upon an anvil fixed underneath; the wheel end of the chain being secured to the center of the groove of wheel, L, insuring the return of the chain or rope and the raising of the bar to be worked. The hammer and anvil dies are placed at an angle for convenience in operating the trip and regulator.

Patented through the Scientific American Patent Agency, August 27, 1867, by Joseph Tandler, Grand Rapids, Mich., who offers state rights for sale.

BETTER waste oil than wear journals; yet wasting of oil is unnecessary if common sense guides its use.

COPPER AND BRASS WORKING.---THE ANSONIA WORKS

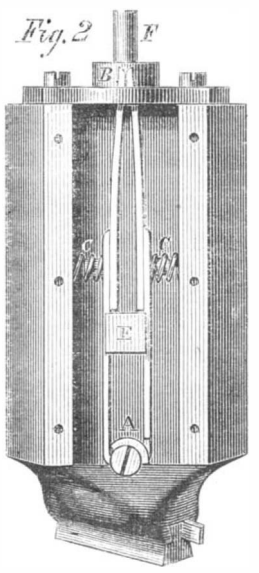
The degree of proficiency attained in working of metals seems fitly chosen to serve as a criterion in determining the grade of advancement in civilization of any age or nation. Favored by some such fortuitous circumstance as the burning of the forests, the existence and mode of reducing the more fusible metals would be revealed to the dullest comprehension, and it is evident that no great amount of skill or ingenuity would then be requisite to enable the savage to fashion a few trinkets or the rudest implements. Metallurgical knowledge among the lowest races generally is confined to an acquaintance with the precious metals, which are made by them to subserve many of the uses for which iron is employed by civilized nations. The more difficult of fusion is the native ore, the greater the talent required for bringing it into subjection; and the skill which can take iron—itself entirely too refractory to be fused as easily as silver and gold, or even if brought to the metallic state by the intense heat of the furnace, could never be wrought with the same ease as the more malleable metals—and make it many hundred fold more precious, weight for weight, than the so-called precious ores, indicates in itself the high grade of progress of the present age.

A knowledge of the properties and value of alloys is evidence of a considerable advancement in the arts of life. Gold, silver, and copper, hardened by combination with tin, constituted the material from which were formed the principal weapons, tools, and metallic manufactures of the early ages, and of the half civilizations of modern times. To the alloy brass is popularly accorded a far greater antiquity than by right it is entitled to. The material is frequently spoken of in our English Bible, even Job mentioning it in the succinct treatise on metallurgy, given in the xxviii. chapter of that book; but the reference is here evidently to copper; and there is little doubt that wherever mentioned throughout the Scriptures, copper rather than brass is meant. Although the Latin word *as* is commonly translated brass, it is stated that of all the specimens of ancient objects made from this material yet found, analyses have failed to discover a trace of zinc, the composition being nearly uniformly copper and tin. The employment of this alloy by the Romans was very general, coins, vases, culinary utensils, ornaments, arms, furniture, and musical instruments all being formed from it, while great attention was given to investigating the properties and studying the best combining proportions of the alloying metals.

The alloys of copper in variety and industrial value, are perhaps the most interesting of any that are worked. The term brass is of somewhat broad significance, including nearly all the alloys of copper; but in its most common acceptation and for the generality of purposes, the alloy bearing the name consists of two parts copper to one of zinc, but the proportions of these ingredients used in the arts are exceedingly various, being altered to suit color and other properties to the purpose for which the alloy is intended. Doubling the amount of spelter to copper, we obtain a gold colored brass, variously designated as Dutch Gold, Prince's Metal, Tombac, and Pinchbeck, the latter alloy having been made historical because coins made from it were forced upon the American Colonies as a circulating medium, thereby raising the righteous indignation of the Revolutionary Fathers, and forming one of the grievances demanding redress from the Mother Country.

A curious fact connected with making brass is that long before zinc was known as such, in its metallic form, the practice was universal of cementing granulated copper with calcined calamine and charcoal, in crucibles exposed to a bright heat. As a result, the zinc was liberated from its oxide and united with the copper, without becoming visible as a distinct metal. The alloy found in lumps at the bottom of the crucibles was remelted and finally cast. Even the latest edition of Webster's Dictionary recognizes only this primitive mode of preparing the alloy.

The preceding remarks were occasioned by a late visit to the extensive establishment of the Ansonia Brass and Battery Company, located in the thriving village of Ansonia, Conn. The village itself—which has now become the center of a large manufacturing interest, and is one of the most important towns in the famous Naugatuck valley—is indebted for not only its name but its very existence to the late Anson G. Phelps, of the firm of Phelps, Dodge & Co., of New York. Twenty-five years ago, this gentleman perceiving the value of water power which might be made available at this spot, selected the locality as the site for what has since developed into the various manufacturing establishments, all conducted under the name above mentioned. The products of the several mills are so well known throughout the country, that a brief note of the processes of manufacturing may prove of interest.



The shops of the company, four in number, as also five other factories scattered through the village, are driven by water power drawn from the Naugatuck river, at a point one mile north of the town of Seymour, and brought by a canal one and one-eighth miles long, under a head or fall of thirty-two and one-half feet, with a permanent power of fifteen feet drawn under a thirty-inch head. The copper-rolling mill, as the first built of the company's shops, is worthy of first notice. Previous to the war, most of the pig copper used in the mill was brought from South America, but now little is derived from this source, as the metal can be obtained at better advantage from the Lake Superior mines, intermediately being smelted at the Baltimore or Cleveland works. The ingots, or plates, on receipt are remelted, refined, and, for convenience, run into plates of uniform size and quality. The rolling of these plates, after a second heating, into long thin sheets; the annealing of the latter to restore somewhat their malleability; immersion in dilute vitriol to remove the black oxide and restore the characteristic pale-red tint of the bright metal; squaring and cutting into required sizes ready for shipment, are all processes too simple to be specifically described.

The brass mill is the most important establishment of the company's, and its several departments will admit of a somewhat fuller description. Lake Superior copper in ingots from the smelting works, as before, and blocks of spelter are

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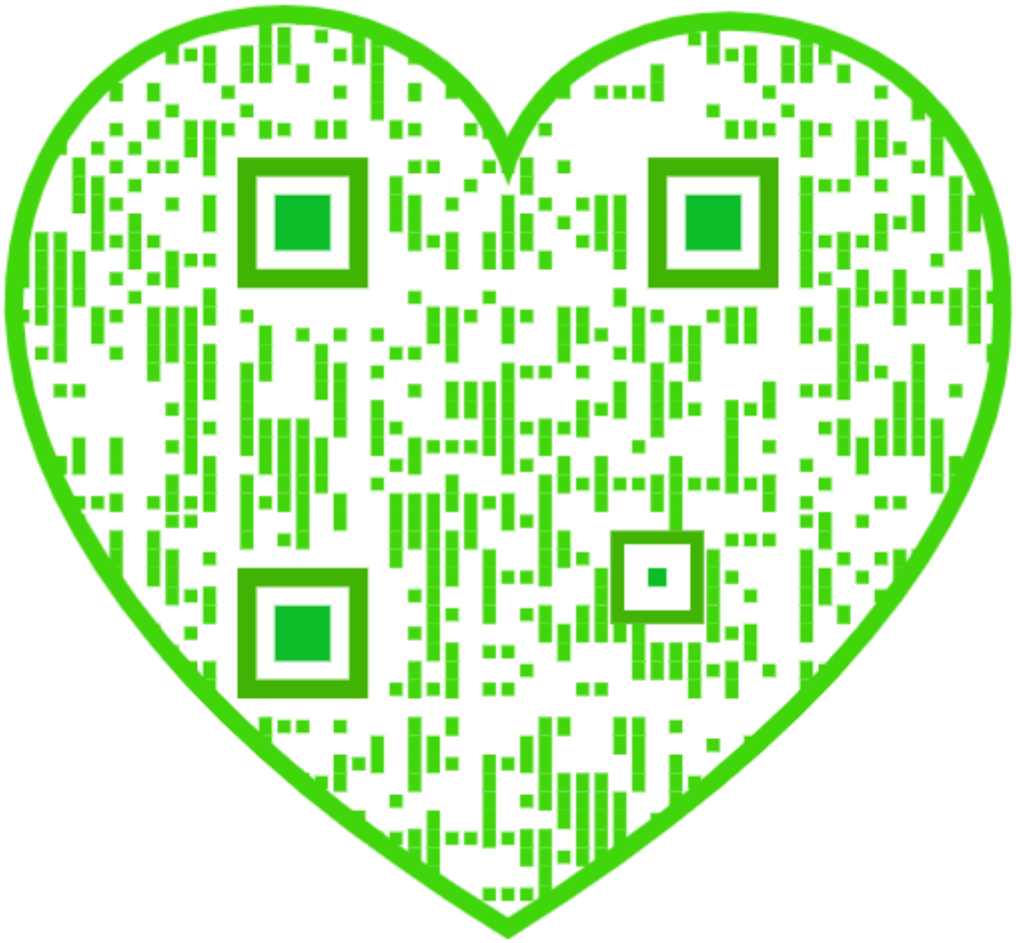

melted together in black lead crucibles and run into plates; these must be annealed and pickled before rolling into strips, in which form, after a part of the hardness imparted to the sheets during the process of rolling is removed, they are sent to market or used in various ways in other parts of the establishments. The mill has the capacity for turning out six thousand pounds of rolled brass daily. The first branch of manufacture which would be likely to engage the visitor's interest, is the mode of making brass tubing. The strips prepared as just stated, are brought from the rolling mill; one end shaped into tube form is placed in the die and the whole strip is forced through the same, whereby a circular, elliptical, star-shaped, or other form of tube results. Several such tubes being placed on a rack, the joint of each is cleaned, a charge of borax and solder placed in it and set by running the whole number simultaneously through a furnace. The oxide raised by the fire is now removed and the tubes are ready for shipment. The number of purposes to which the manufactures of this department are required in every-day use, is much larger than one would suppose; stair rods in a great variety of designs, rails for sliding doors to run upon, lightning rods, are but a few of the multitudinous uses which a little reflection will suggest.

The manufacture of brass kettles by machinery is a branch of industry carried on only at this establishment and by a Waterbury firm. The old English mode of making these culinary indispensables, was by the laborious one of continuously and vigorously hammering upon a sheet of metal until by degrees the required shape was assumed. This process of battering was operated by this company for many years, and furnished the distinctive name by which the company is still called. The plan now in use is known as "Hayden's patent," a patent having been granted for the same, bearing date December 15, 1851. Square blanks of sheet brass are cut into circles of a diameter corresponding to the size of kettle required. After annealing, the metallic disks are brought in contact with cast iron chucks revolving horizontally with great velocity. A small steel friction roller, resembling a button, is then brought in close contiguity to the metal, and, running along the outer surface of the blank, spins it out to the shape of the mold. Four such operations are commonly required before the kettle assumes its finished form, the metal requiring to be annealed after each. The course of the roller is marked by the concentric rings which are found upon most of the brass kettles in market. The processes of wiring, fixing on the ears and bales are all required to make the kettle complete. Sizes range from one half to thirty-two gallons capacity.

Manufacturing burners for kerosene lamps is conducted on a large scale in one department of this shop. The well known "sun burner" is made exclusively by this company, who are the sole proprietors of the patent. Another room in the same building is devoted to making hoopskirt trimmings, apparently a very insignificant industry, but in reality a very thriving one. The pieces are stamped out by the thousands from sheets of copper, tinned, and sold in bulk to the skirt manufactures for fastening the tapes and web to the hoop springs. Harp-hangers for kerosene lamps, clock trimmings, and copper burrs and rivets in almost endless variety are other products of this department. For making the last named, wire is fed into a machine, which cuts it off the proper length, and heads it by two blows. The demand for these articles comes principally from belt, hose, and harness makers. Copper bottoms for kettles, wash basins, and boilers, are stamped out from sheets; annealed and pickled, they are washed on the concave side, first with muricate of zinc, then by a solution of lead and tin; when dried they are ready for the tinners.

In the wire drawing mill, coils of rough imported English wire are drawn by power through dies of varying diameter until reduced to sizes required by the trade. Each drawing necessitates a separate annealing and pickling. The wire is coated with flour or lime to prevent wear on the dies as also to preserve it from oxidation when ready for market. A large amount of wire is called for to supply the pin machines in the neighboring towns of Waterbury and Birmingham, but by far the largest demand the company now have comes from the West, where it is used in enormous quantities for making fences. One of the uses of wire just being introduced, is for making shoe pegs, a Boston notion. The wire for this purpose is made oval or three cornered and a half turn given to the pegs prevents them from drawing out of the boot sole.

Clock making, one of Connecticut's most important industries, is vigorously carried on in Ansonia. The movement and case departments occupy now the same building, pending the construction of a new shop which, on its completion, will be monopolized by the former business. Space would fail to describe the processes of converting the rough stock into attractive and substantial cases, or making the intricate mechanism constituting what is known as the movement, and finally, fitting together the completed whole, ready for a long life of useful service. The shops of this and other companies in the village are open to visitors, and no more instructive summer tour can be undertaken than a trip through the Naugatuck river valley, with a short sojourn at the villages of Birmingham, Ansonia, Waterbury, and Seymour.

MANUFACTURE OF INDIGO CARMINE.

A recipe for a green color for confectioners' use, published in No. 10, current volume, has called forth inquiry as to the nature of indigo carmine, and its method of manufacture The following description will be found a complete answer to these inquiries:

In the first place, the choice of the indigo on which to operate is not without importance. Its price is generally in proportion to the quantity of pure indigotine which it contains, and it is most advantageous to employ the finest qualities, in order to avoid, in manufacturing a fine quality of indigo carmine, a number of purifications, washings, etc., which soon become costly operations. The manufacturer must not allow himself to be entirely guided by the external appearance of the indigo, the best qualities of which are porous, light, clear, etc., but he should ascertain by one of the known methods the quantity of pure indigotine it contains.

Indigo carmine consists of a perfectly uniform paste of a fine copper color, without any granulations. Spread upon a sheet of glass, and viewed by transparency, it should give a pure blue color with a slight tint of violet.

In the manufacture of indigo carmine, the first operation is the pulverization of the indigo. The author places some 10 lbs. at a time in a wooden drum, properly closed, and in which have been previously placed three cannon balls of 6 lbs. weight each. This drum is fixed to a wooden case, which catches any of the powder that may happen to escape during the pulverization. The drum is turned on its axis by means of a handle, and in about three hours the above quantity is completely pulverized. It is then withdrawn, and passed through a silken sieve containing 100 threads to the square inch. Whatever remains on the sieve is put aside, and replaced in the drum in a future operation.

The powder thus obtained must be completely dried, otherwise, when placed in contact with the sulphuric acid in the next operation, it would give rise to a degree of heat which would injure the product. The desiccation is operated at a temperature of 60° to 70° C.

When the pulverized indigo is dry and has cooled, its dissolution in the acid is proceeded with, and as this part of the process determines the result of the manufacture, it is impossible to operate with too much care. The author recommends that small quantities should be operated on at a time, for the work is thus facilitated, and if an accident happens the loss is comparatively slight.

It is best to add the acid to the indigo, rather than the indigo to the acid; the temperature rises less high, less sulphurous acid is produced, and dissolution is more complete. As to the quality of the sulphuric acid employed, it must contain no nitric acid; for complete safety it is best to add a little sulphate of ammonia, to neutralize the effects of any nitric acid that might be present. The concentration of the acid is another point of great importance. Acid at 66° did not yield good results; the stronger the acid, the more perfect the dissolution. It is best to use a mixture of 4½ parts of fuming sulphuric acid and 1 part of acid at 66° Baumé. The weaker the acid the more violet will be the indigo carmine produced when viewed by transparency.

The following is the method adopted by Herr Roesler:

One pound weight of the pulverized indigo is placed in earthenware dishes kept cool by water, and upon it is poured 2¾ lbs. of the mixture of acids above quoted, previously cooled. The mass is stirred with a thick glass rod, slowly at first, then more rapidly, so as to prevent the indigo from agglomerating. In the course of about half an hour the whole forms a dark smooth paste, almost black; it is stirred rather slowly, while a second quantity of acid, equal to that already mentioned, is added. When the mixture froths considerably and evolves much sulphurous acid gas, it is a bad sign; on the contrary, the operation may be considered successful when, after the mixture is completed, the thick foam of little bubbles of gas forms upon the surface while the mass gradually thickens.

It is true that this manner of dissolving indigo is somewhat slow, since one workman can scarcely operate upon a hundred-weight per diem, but the results are always good.

The operation is not yet complete, however; the transformation of the indigo into sulphindigotic acid is not entirely effected, and if the process is immediately continued at this point, a bad result can alone ensue. The earthenware vessels must now be covered to protect them from dust, and their contents allowed to remain in this state for about a fortnight, care being taken to stir up the mixture now and then during that interval, and to warm the vessels a little on the last few days. The whole product is thus transformed into a thick mass, covered by a thinner or more liquid layer.

The next operation is that of precipitation. The contents of five of the earthenware vessels are emptied into a large vat and 237½ pints of pure cold water are added, and then, gradually, a concentrated solution of common salt (1·17 sp. gr.), until the whole of the coloring matter is precipitated. The author formerly used carbonate of soda instead of salt, but the cost is greater and loss of time ensues on account of the violent effervescence.

By the use of common salt a large amount of hydrochloric acid is generated, which attacks the ordinary suspended filters hitherto used. The filtration is therefore effected in cases provided with false bottoms pierced with holes, over which the well-soaked filtering material lies. The first portions which pass must be passed again through the apparatus until the liquid filters clear. The clear solution which filters through is of a blackish green tint. When salt has been used, the clear liquid is afterwards evaporated to crystallize; when chloride of potassium is used, instead of salt, sulphindigotate of potassa is obtained, but this product is not so soluble as the soda compound, and is therefore less esteemed.

When the filtration is finished, the filter is doubled upon itself, and the product submitted to a careful pressure. The cakes of indigo carmine thus obtained are fit for certain purposes; but when it is desirable to furnish a product capable of giving very pure tints, this first yield must be submitted to a few more operations.

The precipitate yielded by 5 pounds of indigo, is mixed with 210 pints of boiling water, and 5 pounds of monohydrated sulphuric acid are added, while the whole is well stirred with large wooden spatules.

Although this quantity of acid is not sufficient to dissolve all the product, it is enough to bring it to a very fine state of division, and to keep in solution all the impurities during the subsequent precipitation. The latter is then operated with 5 pounds of a solution of soda at 90°, and an equal quantity of common salt for every 2 pounds of indigo. The mixture is carefully stirred, allowed to cool, and filtered on cloths about two square yards in size, stretched on wooden supports. The mother water has a dirty green tint. The filtered product is washed until the water which passes has a clear blue tint.

With impure qualities of indigo it is advantageous to repeat the latter operation to obtain a perfectly pure product.

The indigo carmine collected on linen filters is pressed, and finally a little glycerin is added to preserve a proper degree of moisture in the mass.

One pound of indigo yields about ten pounds of indigo carmine.

Do Animals Think or Reason?

The theory that animals think and reason, and their mental manifestations differ from those of mankind only in degree, has found a new advocate in Ernest Menault. Here are some of the stories which he narrates to establish the claims of fleas, fishes, and bugs. He also claims for these inferior creatures the affections of parental love, and an emotional nature, capable of gratitude for kind treatment.

There were industrious fleas before our time. Baron Walckenaer (who died in 1852), saw with his own eyes, for sixpence, in the Place de la Bourse, Paris, four learned fleas perform the manual exercise, standing upright on their hind legs, with a splinter of wood to serve for a pike. Two other fleas dragged a golden carriage, with a third flea holding a whip on the box for coachman. Another pair dragged a cannon. The flea horses were harnessed by a golden chain fastened to their hind legs, which was never taken off. They had lived this way two years and a half, without any mortality among them when Walckenaer saw them. They took their meals on their keeper's arm. Their feats were performed on a plate of polished glass. When they were sulky and refused to work, the man, instead of whipping them, held a bit of lighted charcoal over their backs, which very soon brought them to their senses.

But of what use is cleverness without a heart? The flea has strong maternal affections. She lays her eggs in the crannies of floors, in the bedding of animals, and on babies' night clothes. When the helpless, transparent larvae appear, the mother flea feeds them, as the dove does its young, by discharging into their mouths the contents of her stomach. Grudge her not, therefore, one small drop of blood. For you it is nothing but a flea bite; for her it is the life of her beloved offspring.

While pleading, however, for the flea, we cannot do as much for the bug, though he is gifted with fuller developed intelligence. An inquisitive gentleman, wishing to know how the bug became aware of human presence, tried the following experiment: He got into a bed suspended from the ceiling, without any tester, in the middle of an unfurnished room. He then placed on the floor a bug, which, guided probably by smell, pondered the means of reaching the bed. After deep reflection, it climbed up the wall, traveled straight across the ceiling to the spot immediately over the bed, and then dropped plump on the observer's nose. Was this, or was it not an act of intelligence?

The Fish belongs to the great Flathead family. The same sort of platitude which you see in his person doubtless extends to the whole of his character. You have met him somewhere in human shape—one of those pale-faced wishy-washy gentlemen, whose passions have extinguished all heart and feeling. You often find them in diplomatic regions, and can't tell whether they are fish or flesh. But if their mental powers are less developed, their term of existence is more extended. They gain in longevity what they lose in warmth of temperament.

Nevertheless, the skill with which the stickle-back constructs his nest is now a matter of natural history. Other fishes display an address which we acquire only by long and constant practice. One fellow, with a muzzle prolonged into a narrow tube (which he uses as a popgun), prowls about the banks of tidal rivers. On spying a fly on the water weeds, he slyly swims up until he gets within five or six feet of it. He then shoots it with water from his proboscis, never failing to bring down his game. A Governor of the Hospital at Batavia, doubting the fact, though attested by credible witnesses, procured some of these fish to witness their pranks. He stuck a fly on a pin at the end of a stick, and placed it so as to attract their notice. To his great delight, they shot it with their water guns, for which he rewarded them with a treat of insects.

The pike has proved himself not only intelligent, but even capable—disbelieving it who will—of gratitude.

"While living at Durham," says Dr. Warwick, "I took a walk one evening at Lord Stamford's park. On reaching a pond in which fish were kept ready for use, I observed a fine pike of some six pounds weight. At my approach he darted away like an arrow. In his hurry he knocked his head against an iron hook fixed in a post in the water, fracturing his skull and injuring the optic nerve on one side of his head. He appeared to suffer terrible pain; he plunged into the mud, floundered hither and thither, and at last leaping out of the water, fell on the bank. On examination, a portion of the brain was seen protruding through the fractured skull.

"This I carefully restored to its place, making use of a small silver toothpick to raise the splinters of broken bone.

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The fish remained quiet during the operation; when it was over he plunged into the pond. At first his sufferings appeared to be relieved, but in the course of a few minutes he began rushing right and left, until he again leaped out of the water.

"I called the keeper, and with his assistance applied a bandage to the fracture. That done, we restored him to the pond and left him to his fate. Next morning, as soon as I reached the water's edge, the pike swam to meet me quite close to the bank, and laid his head upon my feet. I thought this an extraordinary proceeding. Without further delay I examined the wound, and found it was healing nicely. I then strolled for some time by the side of the pond. The fish swam after me, following my steps and turning as I turned.

"The following day I brought a few young friends with me to see the fish. He came toward me as before. Little by little he became so tame as to come to my whistle, and eat out of my hand. With other persons, on the contrary, he continued as shy and wild as ever."

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents

Concentration, Transmission, and Transportation of Motive Power.

MESSRS EDITORS:—In the late work of John Bourne, entitled "Recent Improvements in the Steam Engine," in speaking of researches in thermo-dynamics, made by Joule, he says: "It has long been known that heat may be made to produce power, and that power may be made to produce heat. But Mr. Joule has shown by elaborate experiments that the heat produced by friction is the mechanical equivalent of the power expended in maintaining friction; and that the power represented by the descent of a pound weight through 772 feet, or 772 pounds through one foot, would, if expended in friction, produce as much heat as would raise the temperature of a pound of water one degree Fahrenheit. If we had a perfect engine for extracting the power from heat, we ought to be able to recover from the heat generated by friction the exact amount of power expended in generating the heat. But in the best existing steam engines it is found that only about *one tenth* of the value of the heat it obtained as power, the residue being wholly wasted; so that if a steam engine were employed to generate heat by friction, only one tenth of the power would be obtained that would have to be consumed in the production and maintenance of the friction. The steam engine, indeed, has now been found to be a very wasteful machine; and the cause of the waste is traceable to the fact that it deals with extremes of temperature but little removed from one another, instead of with extremes of temperature as far removed from one another as possible."

In view of the facts that such a waste is as far as can be foreseen an inevitable concomitant of the use of steam as a motor, and that as the coal supplies in different parts of the world must eventually fail, and also that the time is not far distant, comparatively speaking, when in many locations the price of coal must advance so as to increase the expense of steam, why steam is the only motor except water power which is to any great extent available becomes a pertinent inquiry.

Although future discoveries may yet render electricity available as a motor, there is no immediate prospect of its becoming so. Heated air is gradually coming more into use for light service, but with this there must be always more or less loss of heat, from the same causes which occasion loss in steam production. There remains the strength of animals; yet with these as motors of machinery, no economy over steam can be obtained. For although a pound of meat, or butter, or honey, or a bushel of corn, will be converted into power with far less waste in the animal economy than similar quantities of coal can be in the furnace of a steam boiler, the preparation of the animal fuel, the conversion of carbon and hydrogen into butter or corn, is an expensive process, and so increases its cost, that, even with a loss of nine tenths, coal could more than compete with it, even though the cost of the latter should far exceed what it is at present.

As all the forms of motion may be traced back to the sun, the great prime mover of our system, it seems singular that the power it is constantly generating should not be employed directly as a motor without having recourse to power stored up in coal beds or wood. This power is constantly raising immense volumes of water to enormous hights, which in their descent would, if utilized, drive a million times more machinery than the world will ever require; but the unequal distribution and irregular precipitation of the water from the clouds, and the level surfaces of many localities, are practical difficulties which obstruct a more general use of water power as a motor.

It is not intended in this communication to place before the public a method for the direct utilization of the sun's heat, which can be said to be free from practical difficulties. It is freely confessed that there are many obstacles to success. But to leave altogether out of consideration a mechanical possibility, because of its attendant difficulties, is, to say the least, not a philosophical method of thought.

Let us see what is the essential nature of these difficulties, and appreciate them to their fullest extent. Suppose it were proposed to utilize the heat of the sun by the expansion of solids, and a method of doing this were required, it might be done as follows: An inclined plane or railroad, having placed thereon a heavily loaded car, with pawls attached, playing in ratchets by the sides of the rails, so that it should be prevented from descent; also, having a long bar of iron or other metal fixed to the lower end of the car with a movable joint, so that the lower extremity of the bar should lie upon a central ratchet lying parallel to and between the rails, would operate thus: The long bar would expand by the heat of the sun, and, being prevented by the central ratchet from downward motion, would push the car up the inclined plane. The side panels and ratchets would hold it there, so that upon subsequent cooling the bar would be drawn up, and, taking a new hold upon the central ratchet, would, when heated again, push up the car. In this way, step by step, through successive days and nights, the car would be lifted to the top of the inclined plane, precisely as a tin roof sometimes crawls out of its place by contraction and expansion. An enormous weight might thus be elevated, which, in its descent, could be made to supply power for mechanical work; but here comes in the practical difficulty. It will have taken days to have thus stored up the force, which, though it might be enormous, would be so concentrated that, to apply it, great multiplication of its motion would be necessary. This would lead to complication of parts, and loss from friction. This description has only been introduced to illustrate the fact that the direct application of the sun's heat to motion can only be practically made by great concentration, through a long period, of the force generated by it, and that the chief practical difficulty lies in the distribution of the force to work after it has been so concentrated.

The inclined planes do not need to be artificial. Nature has provided for that; and the sun, as we have seen, is constantly putting vast weights of water upon their summits. It would be difficult to find a place where power is required in large measure that has not a range of hills within two hundred miles of it, where powerful wheels might be placed. But how transmit the power, or how transport it? This is the question to which the age demands an answer, and to the solution of which mechanical genius should be at once applied. Some suggestions upon the means of so doing must be reserved for a future occasion. A.

A Patent in 1655.

MESSRS. EDITORS:—In the records of the Colony of Massachusetts Bay I find the following passage relating to a patent granted to Joseph Jencks, Sen., for an engine for the more speedy cutting of grass:

"In ans^{r} to the moccon of Joseph Jencks, Señ., itt is ordered that Joseph Jencks, Señ, and his assignes only, shall have libertje graunted to them to make that engine the said Jencks hath proposed to this Court, for the more speedy cutting of grasse, for seven Yeares, and that no inhabitant, or other person wthin this Jurisdiccon, during that tjme shall make or use any of that kind of engine wthout license first obtajned from the sajd Joseph Jencks, on the pœnalty of five pounds for every such engine so made or vsed, to be recoured at any Court in this jurisdiccon by the said Joseph Jencks' Señ., or his assignes."

Can you inform me what sort of engines were made in those days? H. B. HARRISON.

[In "those days" all machines driven by any power except hand labor were called engines. The engine referred to, invented by Joseph Jencks, Senior, mentioned in the colonial records from which the above extract is taken, was one of a series of inventions made by him for the making of scythes and other edged tools with greater speed and perfection than had previously been accomplished. It was not an engine directly applicable to cutting grass, as the quaint language of the record might seem to imply. It was merely a machine, driven by water power, to manufacture scythes upon a new principle of construction, which gave greater length and thinness to the blade, the requisite strength being given to it by welding a rib of iron to the back of it, now done by rolling instead of welding. This was a great improvement upon the short, thick, and clumsy English scythes used at that period. Although many improvements have since been made in modes of manufacturing scythes, no radical change in their form has taken place.

Joseph Jencks, Senior, was one of the most skilled mechanics and inventors of his time. He was the first founder of brass and iron on the Western Continent. In 1652 he was employed by the Colonial Government, to make dies for the silver coins issued to supply the deficiency of specie which at that time embarrassed financial operations. The issue consisted of shillings, for which there were at least sixteen different dies, sixpences, threepences, and twopences. The coins were of very fine metal, but they were worth by weight two pence less in the shilling than the English coin. Mr. Jencks was the maker of the first fire engine ever used in America, anticipating their use in France nearly fifty years.—EDS.

How to Become an Engineer.

MESSRS. EDITORS:—I am not a machinist, but am a natural mechanic—can do a good job at nearly anything with a little instruction. I wish to learn to be a marine engineer (a good one—I mean a competent one). How had I better commence? Is it necessary to learn the machinist business; or had I better try to get a job helping about some marine engine? (I have put up engines—stationary—and run them with good success.) What books had I better commence studying on engineering? I have been a reader of the SCIENTIFIC AMERICAN for sixteen years; it has benefited me very much in a mechanical way. Please give me a little advice to commence with. C. C. R.

Avon, Ill.

["Line upon line, precept upon precept," seems as necessary a rule now as in the time of Solomon. We have published our advice on these matters repeatedly, have replied by mail to many such letters, and not a week passes that we are not called upon personally for our opinion on these subjects. Our advice is always founded on our personal experience as a practical mechanic and on observation, and cannot be more valuable than that of any intelligent mechanic.

There is no royal road to success in mechanics; there are no books published which will make a "natural mechanic" a practical mechanic, and the sooner our young men appreciate the fact the better for their welfare and the credit of the noble army of wealth producers. To be a marine engineer one should understand every part and piece of the engine and all its connections. He should be competent to do or direct in case of accident or repair. How can he best acquire that knowledge? Evidently by practice, and practice must begin in the shop. Jobbing about a marine or any other engine never made an engineer—it may enable one to *run* an engine when everything goes right. But an engineer—"a good one, a competent one"—such as our correspondent evidently desires to be, must begin at the beginning, go into the shop and *work*. In his leisure hours study "Bourne's Hand Book," "Russell's Steam and Steam Navigation," "Main and Brown on the Marine Engine," and other authorities. Still, books are but an aid, an accompaniment to his daily labor and daily experience, and in no case to take the place of that labor or that experience. To ascend a ladder one must begin at the first rung, however much his natural taste may enable him to see through the ladder.—EDS.

To Find the Number of Teeth in the Gears Used on the Spindle and the Leading Screw.

MESSRS. EDITORS:—I send a copy of my rules for screw cutting on engine lathes:

RULE. Take the number of threads in any convenient distance on the leading screw, for the number of teeth on the gear on the spindle, and the number of threads in the same distance on the screw to be cut, for the number of teeth on the gear on the leading screw.

EXAMPLE. The leading screw of a lathe being 5 threads to the inch, required the gears to cut 8 threads.

In 4 inches of the leading screw there are 20 threads which gear put on the spindle, and in 4 inches on the screw to be cut there are 32 threads, which gear put on the leading screw. But suppose you have no 32 tooth gear; take some other distance, say 6 inches, and the gears required will have 30 and 48 teeth. So any distance may be taken.

Again, suppose the leading screw to be 4 threads to the inch; required the gears for cutting 6 threads.

In eight inches of the leading screw there are 32 threads, and in 8 inches of a 6 thread screw there are 48 threads; then 32 and 48 are the gears wanted.

In cutting the same number of threads as the leading screw, the gears should both have the same number of teeth, no matter what that number is.

From the foregoing it will be seen that any gears, having the same ratio to each other as the number of threads given and required, may be used with the same result.

The pitch of a screw is the distance gained, in the direction of its axis, by one revolution of the screw, and is usually expressed by a fraction.

The denominator of the fraction denoting the pitch of a screw, is the number of threads in the number of inches denoted by the numerator.

EXAMPLES. 1-5th of an inch pitch is 5 threads in 1 inch; 3-16ths of an inch pitch is 16 threads in 3 inches; 1 5-8ths pitch is (1 5 8ths = 13-8ths) 8 threads in 13 inches; 11-30ths of an inch pitch is 30 threads in 11 inches; 15 22ds pitch is 22 threads in 15 inches.

In the last two cases suppose the leading screw to be 5 threads to the inch; required the gears.

In 11 inches of the leading screw there are 55 threads, and in 11 inches of the screw to be cut there are 30 threads. Put 55 gear on the spindle, and 30 gear on the leading screw. Again, in 15 inches of the leading screw there are 75 threads, and in 15 inches of the screw to be cut there are 22 threads; but suppose there is no 22 gear at hand, or if it is at hand it is too small to be driven without crowding; double the numbers already found, and use 150 gear on the spindle, and 44 on the leading screw.

TO FIND THE PITCH OF A SCREW.

Lay a rule on the screw, in the direction of its axis, and note where the threads correspond with the inch marks on the rule; make the number of threads the denominator and the number of inches the numerator of a fraction, which fraction will denote the pitch in its lowest terms. If the fraction be an improper one reduce it to a mixed number. If the fraction is a proper one the number of threads to the inch may be found by dividing the denominator by the numerator.

EXAMPLES. 3-16ths pitch is (16÷3=5 1-3) 5 1-3 threads to the inch. 11-30ths of an inch pitch is (30÷11=2 8-11) 2 8-11ths to the inch.

In counting a square thread screw be careful to count a thread and a space also.

In two or three thread screws the pitch should be taken at twice and three times, and the number of threads at one half or one third that of a single thread screw.

Intermediate gears are used only to transmit motion, and the number of their teeth does not affect their work, but it sometimes happens that the pitch of the screw to be cut, is so much greater or less than that of the leading screw, that one gear is too large or the other too small. In that case the speed of the leading screw may be increased or reduced by two gears fixed together on the same stud, one being half the size of the other.

EXAMPLE. The leading screw being twelve threads per inch, required the gears for cutting 2 threads per inch.

Take the number of threads in 10 inches, which will be 20 and 120 on the spindle and 20 on the leading screw, but so small a gear on the leading screw will crowd and drive hard. So double the number of teeth on the small gear, and put 40

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on the leading screw, and use two intermediate gears on the same stud, one with double the number of teeth of the other, and let the gear on the spindle work into the smaller one and the gear on the leading screw work into the larger one, and the required speed will be obtained.

Left hand screws gain in the opposite direction from right hand screws, and one more or one less intermediate gear is used to give the proper motion.

In cutting large screws much time is saved by using a half nut which may be raised off the screw while the carriage is moved by hand. When the screw to be cut is the same pitch as the leading screw or one half or one fourth of the same, the lathe may be kept running ahead all the time. But when the pitch is different, if the lathe be stopped at the end of each cut, and the carriage moved back by hand, a certain number of inches the nut will gear into the screw all right.

Examples. The leading screw being 4 threads per inch, to cut 3 1-3d threads, the carriage may be moved, 3, 6, 9, or 12 inches. 2 1-2 threads, 2, 4, 6, or 8 inches.

Milton, Mass. E. S. Chapell.

Do Water-Wheels Run Faster in the Night than in the Day?

Messrs. Editors:—There seems to be a very general belief among those who have charge of mills, that the water wheel runs with more force at night than during the day time. This idea is regarded by many as a superstition; but I am inclined to think that there are valid reasons for believing that it has a foundation in fact. The wheel is put in motion by the gravity of the water. Gravity results from a mutual attraction of particles for each other—a law which no one will dispute prevails through the solar system. At noon, the attraction of the sun would have the effect to counteract the attraction of the earth, and lessen the gravity of the water; while at midnight the attraction of the sun combines with that of the earth to increase the gravity of the water. If this theory be true, the effect should be most marked at the new of the moon, when the attraction of the sun and moon tends to counteract that of the earth during the day time, and to combine with it at night. Under these circumstances the gravity of the water, and the dynamic force exerted by the wheel must be greater at night than in the day time? How could it be otherwise?

New York city. F. G. Fowler.

[The "general belief" (in which we have never shared) may be easily demonstrated as to its truth or falsity, and therefore does not require argument. But the theory of our correspondent as to the cause of the fact (if the fact exists) does not seem to be entirely satisfactory. The combined influence of sun and moon is only sufficient to produce the rise in the ocean known as the tide; and even allowing for its extreme hight on shores the peculiar conformation of which concentrates, so to speak, the force otherwise spread over a large surface, yet the total rise is hardly to be appreciated when considered with reference to the bulk of the earth. It was announced some time ago, as a remarkable fact (?), that a tide of one third of an inch had been detected in Lake Erie. If on so large a body of water only one third of an inch rise takes place, how much would the tide (combined attraction of sun and moon) of a mill pond affect the running of a water wheel?—Eds.

Plan for Index Plates.

Messrs. Editors:—Since my last communication to your paper (on page 101, current volume), I have worked out the following combinations for an index plate. Holes drilled:

77	97	113	129	141	276	372	468
79	98	115	130	142	288	384	480
83	101	118	131	143	300	396	492
86	103	119	133	145	312	408	504
89	106	121	134	146	324	420	
91	107	122	135	147	336	432	
94	109	125	137	149	348	444	
95	110	127	139	264	360	456	

In this plan there are only sixty circles of holes, with a total of 12,629 holes to be drilled.

Any gear below 151 teeth can be cut on it; also, the following, because

152	is a factor of		456,	174	"	348,	210	"	420,	246	" 492,
156	"	"	468,	180	"	360,	216	"	432,	252	" 504;
160	"	"	480,	186	"	372,	222	"	444,		
162	"	"	324,	192	"	384,	2 8	"	456,		
164	"	"	492,	198	"	396,	234	"	468,		
168	"	"	336,	204	of	408,	240	of	480,		

which will allow 186 different changes of gear to be cut between 6 and 504 teeth, inclusive.

Kalamazoo, Mich. E. H. H.

Messrs. Editors:—I see, page 83, that P. H. Vander Weyde asserts that the sticking qualities of glue seem improved by the addition of Paris white. I concede that it adds to its appearance and weight but nothing more. The combination is a mechanical one, and is just the same as so much foreign matter in a state of minute division which is anything else but desirable in a good article of glue. If a microscopic examination is made of a joint made by a mixture of glue and Paris white and afterward torn apart, it will be found that each grain, so to speak, is enclosed in a separate cell formed by the glue. These sacs occur in minute division and separate the glue wherever they occur. This being the case, it certainly cannot be beneficial to add Paris white more than to increase the weight and add to its appearance.

Marcus Jones.

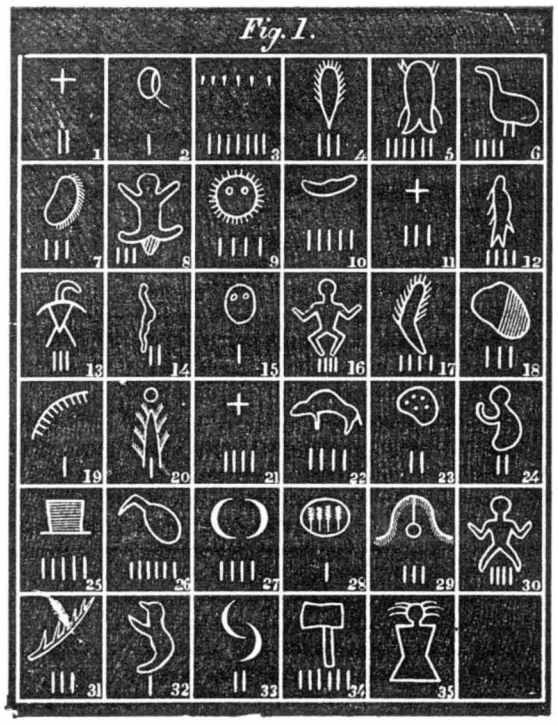
Frankfort, Ky.

Messrs Editors: What is the size and capacity of the largest water-wheel in the United States?

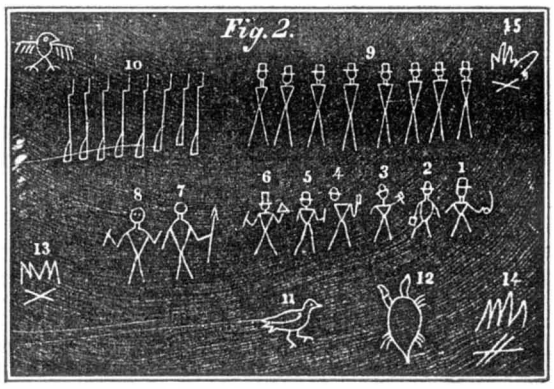
For three years, St. Louis has been at work in an artesian well, seeking for water, as we quite recently mentioned. A few days ago the boring was ordered to cease, at the depth of three-quarters of a mile.

The Written Languages of Savages.

In our last issue we published an article on the "Arts and Manufactures of Savages," being a synopsis of two of a series of lectures delivered by Sir John Lubbock, Bt., F. R. S., before the Royal Institution. In the same series he has attempted to show the crude ideas of written language entertained by uncivilized man, using as illustrations copies of the written language of North American Indians. Three of

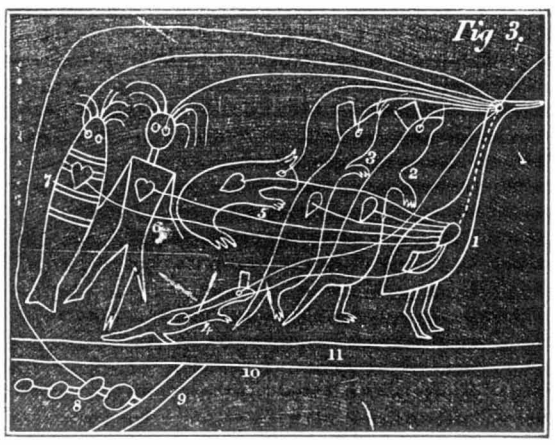


these we reproduce from a notice of his lectures as published in the *Engineer*. It will be seen that the attempts of savages to produce a representation of ideas by visible signs are similar to those made by the children of educated and enlightened parents—merely natural symbols, or rather pictorial representations. By neither can the connection between the parts of a sentence be discovered without the exercise of experienced judgment or of a lively imagination, and either may go astray unless guided by practice and a knowledge of the habits of thought of the writer. It is evident that pictorial writing could be useful mainly in the statement of bald facts, as only visible or otherwise well known objects



could be depicted, and thus any system of philosophy dependent on its transmission by visible signs, as written characters, was impossible to the nations or tribes who did not possess either an alphabetical system or one of arbitrary characters to which meanings commonly accepted are attached.

Yet it would seem that the fact that the Aztecs of Mexico, the Inca race of Peru, and the Chinese, all had, and have, only a pictorial language; that the ancient Assyrians and Egyptians used pictorial or hieroglyphic signs to denote ideas, and yet each and all attained to a high degree of



civilization, and developed systems of social and moral philosophy, would militate strongly against the assumption that an alphabetical or arbitrary language is necessary either to the production and transmission of any system of philosophy involving abstract ideas or against a high degree of cultivation by means of picture writing. But it must be considered, as an offset to this view of the subject, that a knowledge of the mysteries of ancient philosophy were obtained mainly by personal acquaintance with their ceremonies and transmitted orally by the aid of symbols.

All writing probably was originally of a representative or pictorial character. We presented this view of the case with diagrams on pages 266 and 353, Vol. XV. Scientific American, in relation to the probable original form of the Arabic numerals, and according to Sir William Jones the elaborate written system of the Chinese is to this day but a system of picture writings, abstract ideas being conveyed by symbols derived from crude representations of visible objects.

Fig. 1 of the diagrams represents an Indian census roll or roster of a band entitled to annuities from the United States Government. Some of the figures in the compartments are easily recognizable as No. 5, a catfish, the six strokes denoting the number of individuals in the family. No. 8 is the beaver family of three persons; number 9, the sun; 13 the eagle; and here we see the popular and traditional "spread eagle," still seen on our coins and coats of arms. No. 14 is a snake; 22, a buffalo; 34, an ax; 35, a "medicine man," or priest, etc.

According to Schoolcraft, a party of explorers, with two Indian guides, saw one morning, as they were about to start, a leaning pole stuck up in the direction they were going, holding at the top a piece of birch bark covered with the drawings shown in Fig. 2. No. 1 represents the officer in command of a squad of United States soldiers. He carries a sword to denote his rank. No. 2 is the secretary, holding a book. No. 3 is the geologist and mineralogist of the party, carrying a hammer. Nos. 4 and 5 are attachés. No. 6 is the interpreter. No. 9, eight infantry soldiers, their muskets shown in No. 10. No. 15 denotes that they had a separate fire and constituted a separate mess. Nos. 7 and 8 are two Chippewa guides. It will be noticed that the whites are all represented with hats; the Chippewas have none. The hawk with spread wings shows the party to be on a journey, and Nos. 11 and 12 are a prairie hen and turtle, the proceeds of the previous day's chase.

One of the best specimens of Indian pictorial writing is shown in Fig 3, which represents an Indian petition to the President of the United States, and is thus described by Schoolcraft: "No. 1 is the totem of the chief, called Oschabawis, who headed the party, who is seen to be of the *Ad-ji-jauk*, or Crane clan. To the eye of the bird standing for this chief the eyes of all the other totemic animals are directed, as denoted by lines, to symbolize union of views. The heart of each animal is also connected by lines with the heart of the Crane chief, to denote unity of feeling and purpose. If these symbols are successful they denote that the whole party see and feel alike—that they are one. No. 2 is a warrior, called *Wai-mit-tig-oazh*, of the totem of the Marten. The name signifies literally "He of the Wooden Vessel," which is the common designation of a Frenchman, and is supposed to have reference to the first appearance of a ship in the waters of the St. Lawrence. No. 3, *O-ge-ma-gee-zhig*, is also a warrior of the Marten clan. The name means literally "Sky Chief." No. 4 represents a third warrior of the Marten clan. The name of *Muk-o-mis-ud-ains* is a species of a small land tortoise. No. 5, *O-mush-kose*, or the Little Elk, of the Bear totem. No. 6, *Penai-see*, or the Little Bird, of the totem of the *Ne-ban-a-baig*, or Man Fisher. This clan represents a myth of the Chippewas, who believe in the existence of a class of animals in the Upper Lakes, called *Ne-ban-a-baig*, partaking of the double natures of a man and a fish, a notion which, except as to the sex, has its analogies in the superstitions of Western Europe, respecting a mermaid. No. 7, *No-wa-je-wun*, or the "Strong Stream," is a warrior, of the *O-was-se-wug*, or Catfish totem. Beside the union of eye to eye, and heart to heart, above depicted, *Osh-ca ba-wis* as represented by his totem of the Crane, has a line drawn from his eye forward, to denote the course of his journey, and another line drawn backwards to the series of small rice lakes, No. 8, the grant of which constitutes the object of the journey. The long parallel lines, No. 10, represent Lake Superior, and the small parallel lines, No. 9, a path leading from some central point on its southern shores to the villages and interior lakes, No. 8, at which place the Indians propose, if this plan be sanctioned, to commence cultivation and the arts of civilized life. The entire object is thus symbolized in a manner which is very clear to the tribes.

Saponification under Pressure.

We condense from *Engineering* the following description of the method generally used in England for the separation of Stearic and Oleic acids:

"Fatty matters, whether of vegetable or animal origin, are always found combined intimately with glycerin, and may be regarded as stearates or oleates of glycerin. Many processes are employed to separate the stearic from the oleic acids, all of which have for their object the destruction of the combination of stearate or oleate of glycerin, so that the liberation of the stearic acids may be insured. These acids are solid at moderate temperatures, are hard, white, crystalline, and odorless, and are employed in the manufacture of candles. Oleic acid is used also in the fabrication of soap, and in the cleansing of wool previous to its being spun into yarn. The most general method followed in England for separating these combinations consists of a treatment with sulphuric acid, followed by distillation. The fatty matters are placed in contact with concentrated sulphuric acid, and form combinations of sulpho-stearic, sulpho-oleic, and sulpho-glycerine acids. These all increase in bulk when in boiling water and decompose, but the glycerin and carbon remain interspersed in the mass, and it is necessary to complete the first operation by distilling these carbonic and tarry matters remaining in the distilling apparatus, so that the fatty acids may be volatilized and carried away for condensation in the refrigerator.

This process is advantageous because the production of solid fatty acids is considerable, as much as sixty-five per cent of solid matter being sometimes obtained, but the stearic acid produced by this process melts at a lower temperature than that obtained by saponification; and the oleic acid, more

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readily decomposed, undergoes in this treatment such alterations as to render its employment in the manufacture of hard soap very difficult. It is suitable enough, however, as an ingredient in soft soap with a potassa base, a soap much used in Belgium and Holland, which explains the favor which the distillation process enjoys in those countries. Saponification by lime is, however, generally more employed. The process of decomposition with water under a high pressure and temperature is beginning to find favor in places where sulphuric acid is costly, but certainly the former method is in use in most manufactories. It is the most simple of all, as well as the oldest, and it gives undoubtedly the best results, although it is the most costly. Six operations are necessary to convert the tallow into fatty acids.

1. The formation of the soap of lime.
2. Its extraction from the vat.
3. The decomposition of the soap of lime by sulphuric acid.
4. The washing with acidulated water.
5. Washing with pure water.
6. Crystallization.

Then follow, by different means, the separation of the solid from the liquid acids, by means of hydraulic pressure. Until latterly, the saponification of lime has been effected in large wooden vats, in which the melted tallow was mixed with lime, in the proportion of 14 of lime to 100 of tallow. Boiling was necessary for six or seven hours, and it was indispensable, for the success of the operation, that the mass should be kept constantly in agitation by stirring. This process, besides being tedious to the workmen, long and very difficult to carry out properly, required a considerable quantity of steam; and, in spite of all care, saponification was always incomplete, especially in those places where the current of steam had not properly penetrated.

To obviate these imperfections an apparatus has been devised working under a mean pressure of forty-five pounds, in which the saponification by lime is worked economically without manual labor, with a reduced proportion of ten or eleven per cent of lime, in place of fourteen per cent, and without a large consumption of steam.

The process is effected in a fixed temperature of 130°, instead of that of 100°, which it is impossible to exceed in an open vat, is always chemically complete, and the separation of the oleic acid is easily effected by hydraulic pressure.

This apparatus is working at the present time in eighteen different manufactories on the Continent, and is in course of construction at twenty other establishments. The tallow is melted in a sheet iron basin, and the lime is prepared in an adjacent vessel. These vessels are provided with large taps, and the bases are inclined to facilitate the flowing out of the liquid. In each is placed a steam injector to heat the mass. Both basins are of exact size, and so determine the proportionate quantities of matter under treatment. The melted tallow and lime flow into an upright chamber, and thence forced up a pipe by hydraulic pressure into the saponifier, which forms a large boiler of sheet iron, working up to seventy-five pounds pressure per inch, and placed vertically, resting on four feet, which lift the lower end about three feet three inches from the ground. This apparatus is provided at the upper part with valves, gages, taps, etc. On one side are placed cocks at different levels, in order that samples may be drawn off from time to time. On the lower end are placed the steam injectors, and so constructed that the closing of valves on the inside prevent any of the melted contents of the boiler from flowing into them. A large cock for drawing off is provided, and a pipe carries the calcareous soap into the decomposing chamber. The mingled tallow and lime are discharged from their respective vessels into the chamber, whence they are forced up a pipe into the boiler; there, two or three jets of steam, according to the size of the apparatus, are discharged into the boiler by tweers, and all communications to or from it are closed. The steam in penetrating into the boiler heats the liquid mass, and the saponification becomes perfect without any assistance from workmen. From time to time it is advisable to test the progress by drawing samples from the taps, and after five or six hours the pressure in the boiler and the steam generator having become equal, the process is complete.

The water saturated with glycerin is then drawn off by the taps at the bottom of the boiler, and the calcareous soap is taken into the decomposition chamber, where the sulphuric acid combining with the lime, forms a sulphate of lime, and liberates the fatty acids. The mass leaves the boiler at a pressure of about sixty pounds, and on reaching the open air the fat contained separate breaks up and falls down in powder, the more readily and completely the smaller the quantity operated on at a time. The soap being instantly decomposed, the fatty acids are not exposed to a long contact with the sulphuric acid, and are then neither attacked nor destroyed. To prevent the soap being thrown in its ebullition beyond the decomposing vat, the pipe in communication with the boiler is turned upwards at the end, and discharges the soap against a cone of sheet iron upon which it bursts and breaks and falls down again into the decomposing vat below.

Not only does this system of treatment produce fatty acids, whiter and harder, but the saponification being always complete, there is a larger production of oily matter from the solid residuum when submitted to hydraulic pressure, amounting to fifty per cent, whereas by other methods only forty-seven per cent can be obtained. In the next consideration of cost, the expense of lime, of sulphuric acid, of coal, and of hand labor, a saving of thirty-five per cent. is made on the cost of the old method.

A HAMBURG inventor is making paper from tobacco stems, to be used as cigar wrappers in place of the more costly leaves, and the application is said to be quite satisfactory.

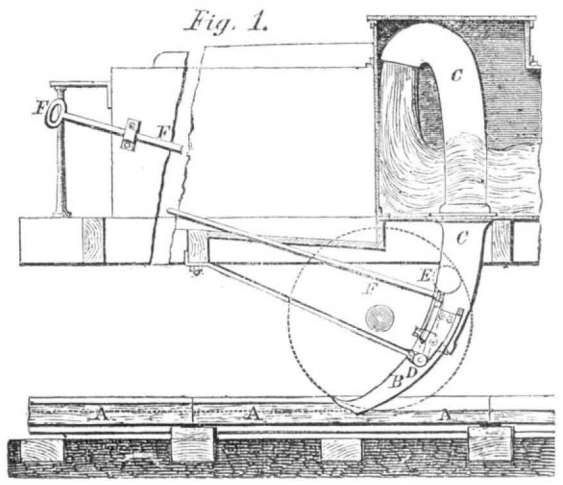
RECENT IMPROVEMENTS IN THE STEAM ENGINE FEEDING SCOOP FOR LOCOMOTIVES.

The name of John Bourne has become so well known to mechanical engineers through his former works, that the simple announcement of another treatise from his pen is sufficient to secure its favorable reception. The little work entitled, "Recent Improvements in the Steam Engine" which has just been issued from the press of J. B. Lippincott & Co., Philadelphia, is a supplement to the Catechism of the Steam Engine, and contains the most recent improvements both in construction and practice as well as the most novel applications of steam power as a motor, together with accounts of the latest improvements in steam, air, and gas engines as shown in the Paris Exposition of 1867. It is profusely illustrated, and should be read by all interested in the progress of the arts.

As a specimen we extract the following description of the feeding scoop for locomotives as now used in England for supplying water to them while running, and have also reproduced the engravings by which the device is illustrated.

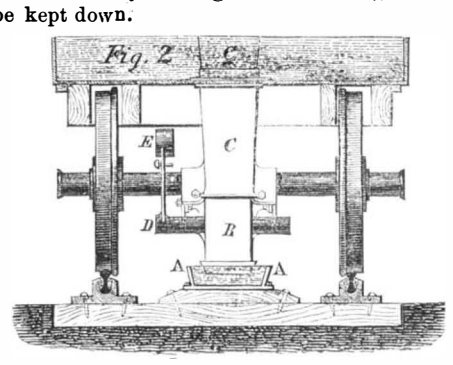
"This apparatus, represented in Figs. 1 and 2, consists of an open trough of water, lying longitudinally between the rails at about the rail level, and a dip-pipe or scoop attached to the bottom of the tender, with its lower end curved forward and dipping into the water of the trough, so as to scoop up the water and deliver it into the tender tank while running along.

Fig. 1.



"The water trough, A, Figs. 1 and 2, of cast iron, 18 inches wide at top by 6 inches deep, is laid upon the sleepers between the rails at such a level that when full of water the surface of the water is 2 inches above the level of the rails. The scoop, B, for raising the water from the trough, is of brass, with an orifice 10 inches wide, by 2 inches high; when lowered for dipping into the trough, its bottom edge is just level with the rails and immersed 2 inches in the water. The water entering the scoop, B, is forced up the delivery pipe, C, which discharges it into the tender tank, being turned over at the top so as to prevent the water from splashing over. The scoop is carried on a transverse center bearing, D, and when not in use is tilted up by the balance weight, E, clear of the ground. For dipping into the water trough it is depressed by means of the handle, F, from the footplate, which requires to be held by the engine-man as long as the scoop has to be kept down.

Fig. 2.



The upper end of the scoop, B, is shaped to the form of a circular arc, as is also the bottom of the delivery pipe, C, so that the scoop forms a continuous prolongation to the pipe when in the position for raising water. The limit to which the scoop is depressed by the handle, F, is adjusted accurately by set screws, which act as a stop and prevent the bottom edge of the scoop being depressed below the fixed working level. The set screws also afford the means of adjusting the scoop to the same level when the brasses and tires of the tender have become reduced by wear, causing the level of the tender itself to be lowered. The orifice of the scoop is made with its edges beveled off sharp, to diminish the splashing; and the top edge is carried forward 2 or 3 inches and turned up with the same object

"The water trough, A, is cast in lengths of about 6 ft., so as to rest upon each alternate sleeper, and is fixed to the sleepers, the hight being adjusted by means of wood packing. The ends of each length are formed with a shallow groove, in which is inserted a strip of round vulcanised india-rubber, to make a flexible and water-tight joint, the metal not being in contact; this meets all the disturbances arising from expansion, settlement of road, and vibration caused by the passage of trains. The length of trough now laid on the Chester and Holyhead Railway near Conway is 441 yards on the level; and at each end the rails are laid at a gradient of 1 in 100 for a further length of 16 yards, the road being raised for that purpose, so that the summit of the incline is 6 inches higher than the level portion: the trough is tapered off in depth to a bare plate, so that the same thickness of wood packing serves for fixing it throughout the entire length. The portion of the line where the trough is fixed is a curve of 1-mile radius, and the outer rail is canted 1 inch above the inner, the wood packing being made taper for fixing the trough horizontal; but the cant does not interfere with the efficient action of the scoop on the tender, since it amounts to only $\frac{1}{8}$ inch on the 10-inch width of scoop. At each extremity of the water trough is an overflow pipe, limiting the hight of water in the trough.

"The trough contains 5-inch depth of water, and the scoop dips 2 inches into the water, leaving a clearance of 3 inches at the bottom of the trough for any deposit of ashes or stones. The trough is so constructed as to present no obstruction to be caught by any loose couplings or drag-chains that may be hanging from the trains passing over it; and experiments have been tried with a bunch of hook chains and screw couplings hanging down behind the tender and dragged along the trough without any damage occurring.

"As to any difficulty from ice, a thorough trial has been afforded by severe winters; and by means of a small ice plough, which was run through the trough by hand each morning, the coating of ice was removed from the surface of the water, and no more was formed afterward excepting a film so thin that it was removed by the scoop itself in passing through the trough without being felt at all. It has indeed been shown, that the continuance of this action with the succession of trains in ordinary working would be sufficient in this climate to prevent the formation of any ice thicker than could be readily and safely removed by the passage of the scoop alone, even during the severest seasons.

"The principle of action of this apparatus consists in taking advantage of the hight to which water rises in a tube, when a given velocity is imparted to it on entering the bottom of the tube; the converse operation being carried out in this case, the water being stationary and the tube moving through it at the given velocity. The theoretical hight, without allowing for friction, etc., is that from which a heavy body has to fall in order to acquire the same velocity as that with which the water enters the tube. Hence, since a velocity of 32 feet per second is acquired by falling through 16 feet, a velocity of 32 feet per second, or 22 miles per hour, would raise the water 16 feet: and other velocities being proportionate to the square root of the hight, a velocity of 30 miles per hour would raise the water 30 feet very nearly (a convenient number for reference), and 15 miles per hour would raise the water $7\frac{1}{2}$ feet—half the velocity giving one quarter the hight. In the present apparatus the hight that the water is lifted is $7\frac{1}{2}$ feet from the level in the trough to the top of the delivery pipe in the tender, which requires theoretically a velocity of 15 miles per hour; and this is confirmed by the results of experiments with the apparatus: for at a speed of 15 miles per hour the water is picked up from the trough by the scoop and raised to the top of the delivery pipe, and is maintained at that hight while running through the trough, without being discharged into the tender.

The theoretical maximum quantity of water that the apparatus is capable of lifting is the cubic content of the channel scooped out of the water by the mouth of the scoop in passing through the entire length of the trough; this measures 10 inches width by 2 inches depth below the surface of the water in the trough, and 441 yards length—amounting to 1,148 gallons or 5 tons of water. The maximum result in raising water with the apparatus is found to be at a speed of about 35 miles per hour, when the quantity raised amounts to as much as the above theoretical total; so that, in order to allow for the percentage of loss that must unavoidably take place, it is requisite to measure the effective area of the scoop at nearly the outside of the metal, which is $\frac{1}{4}$ inch thick and feather-edged outward, making the orifice slightly bell-mouthed and measuring at the outside $10\frac{1}{2}$ inches by $2\frac{1}{4}$ inches; this gives 1,356 gallons for the extreme theoretical quantity. By experiment it appears that the variation in the quantity of water delivered is very slight at any speed above 22 miles per hour, at which nearly the full delivery is obtained; the greater velocity with which the water enters at the higher speeds being counterbalanced by the reduction in the total time of action while the scoop is traversing the fixed length of the trough. It also appears that at any speed above that which is sufficient to discharge the water freely from the top of the delivery pipe, all the water displaced by the scoop is practically picked up and delivered into the tender. In these experiments the water level was maintained the same in the trough each time by keeping it supplied up to the overflow orifice at each end; and the scoop was lowered to the same level each time by means of the set screws, the hight of the tender itself being maintained practically the same in each case.

The construction of this apparatus was pressed upon Mr. Ramsbottom by the accelerated working of the Irish mail, the arrangements connected with which made it necessary that the train should run from Chester to Holyhead (a distance of $84\frac{3}{4}$ miles) in two hours. A supply of 2,400 gallons of water is found to be required for this journey in stormy weather, and it became necessary, therefore, either very much to enlarge the tender tanks, or to introduce an arrangement under which the tender could take up water while running. The latter expedient was preferred, and it has now been matured and utilized with complete success.

IN Dayton, Ohio, recently, a little girl named Foley swallowed a glass button, which passed into the lungs and would not be dislodged. Dr. Reeves, as a last resort, cut a hole in the child's throat, holding it open by instruments, and on the third day after the incision, the child, in a fit of violent coughing, ejected the button through the aperture, and is now doing well.

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Pyrometers.

In our issue of August 5th, we referred to the instruments for indicating high temperatures, made by Wedgewood and Daniel. There are however others of American and English make, in extensive use, depending in their construction, on the difference of expansion of various metals under heat, which answer well for lower temparatures, and are less expensive. Mr. Gauntlett has long supplied the Blast Furnaces in England, with an instrument having a brass stem about four feet long inclosing a steel rod; this gives good satisfaction in biscuit manufacturing, oil refining, wire annealing, and similar operations, where the temparature is under 800 degrees. Above this figure and especially if continued for a length of time in a red heat, the brass tube is liable to be injured. To indicate the increased temperature now used in blast furnaces, Mr. Gauntlett has introduced an instrument the stem of which is composed of tubes of refractory clay, enclosed in an iron stem about three feet long, this is more durable in a temperature of 1,000 or 1,200 degrees, and is highly spoken of. The Agent for them is Edward Brown, 311 Walnut St., Philadelphia.

Effect of the Galvanic Current upon the Tenacity of Wire.

Mr. James Wylde has made public the results of some experiments which are of great importance to telegraphic science. He says that he found, some years since, that when intense currents were passed through the best copper wire, in only one direction, its tenacity was gradually destroyed, so that it could finally be crushed to pieces by the fingers. This loss of tenacity occurred first and in a greater degree at the negative pole. An examination with a microscope revealed at the broken surface a complete molecular change, a crystalline structure having taken the place of the fibrous. He states that, having entered upon some extended experiments in connection with submarine explosions by means of the voltaic current, he was frequently annoyed by the breaking of one of the wires, and in all cases found the structure at the broken part crystalline. From these facts he infers that intense currents passed through submarine cables must eventually deteriorate them, and counsels their avoidance. The frequent reversal of the current, in regard to direction, lessens or entirely prevents the molecular change in the wire.

Neutralization of Magnetic Influences.

M. Arson has sent to the French Academy of Sciences a second paper on his system of neutralizing magnetic influences on board iron ships, and recommended experiments to be made on the iron advice-boats now constructing in the French harbors. As these boats are being built by sections, nothing would be easier than to introduce plates of copper between them, and to use brass rivets, whereby the magnetic forces, neutralizing each other, would cease to exercise any action on the needle. M. Treves wrote to say that he had communicated to the Minister of Marine a new plan for the construction of the mariner's compass. The binnacle is to be of thick copper, and under each rose a thick horizontal plate of the same metal is to be placed, M. Treves having ascertained that copper exercises an influence on the needle by deadening its oscillations.

The Case of Dawson vs. the Bricklayers' Union.

While we greatly regret the unsettled state of the differences that unfortunately exist between the trades unions, and those who believe these organizations either unnecessary, or injurious to the interests of all parties concerned, we trust that the legal controversies that have grown out of them will result in a definite understanding of the exact legal status of these combinations.

The case of Henry B. Dawson, against the Bricklayers' Union in Westchester Co., the initiatory proceedings of which were noticed on page 3 of the current volume of the SCIENTIFIC AMERICAN, has finally resulted in a verdict adverse to the defendants. The complaint charged a conspiracy against the defendants, in that they prevented the son of the plaintiff from obtaining employment. We understand that an appeal from the verdict rendered will be made, and it yet remains to be seen what will ultimately come of it. The case is an important one, and its progress will be watched with interest by employers and employés throughout the entire country. Meanwhile it will not be surprising if the success so far gained by the plaintiff in this case should encourage further litigation, but as the case can not be said to have terminated, it would be wiser, we think, to await its final result.

"THE SCIENTIFIC AMERICAN.—This journal is certainly one of great value. We have read it with interest for twenty years, and it is among the first papers inquired for by our children when the time for its weekly visit arrives. It is full of important suggestions and scientific facts; and we think it has done more to elevate and stimulate thought among the laboring classes, than any other journal published in this country or Europe. Many years ago we received a suggestion from its pages, which was worth to us pecuniarily several thousand dollars. It is probable others can make a similar statement. We are led to make these observations in justice to an excellent journal."

We extract the above notice from the *Boston Journal of Chemistry*, one of our most valuable exchanges, edited by Dr. James R. Nichols.

IT it stated that the Conecuh and Pensacola rivers are literally jammed for a distance of 200 miles with saw logs belonging to the Pensacola Lumber Co. They are destined to be sawed at Molino.

Editorial Summary.

A NEW ENGLAND paper speaks of a flourishing establishment at Middletown, Conn., engaged in the manufacture of silver plated ware, calling special attention to the fact that the business was begun four years ago in a small room, and with one machine, while seventy-five men are now required to produce the goods which the market demands. The success of this concern, and its quick growth into a large business is not a rare event. Beekman street, in this city, is the home of hardware dealers, for example; and many of the most extensive and attractive stores devoted to the sale of hardware sundries on the street, are the metropolitan salesrooms of gigantic manufacturing concerns that commenced like this one quoted by the New England paper, "in a small room, with one machine." The history of some of the heaviest hardware manufacturers of New Britain, Middletown, Bridgeport, Waterbury, and Norwalk, Conn., would be an exceedingly interesting and attractive one.

ONE of the most industrious streams in the country, is the Quinnebaug, which starts for the Atlantic from Massachusetts, *via* Norwich, Conn. Before it is fairly on its way, it is pressed into service at Southbridge and obliged to turn the wheels of at least a dozen factories, most of them cotton, and extensive. After that it hurries southerly through eastern Connecticut, turning a wheel at almost every furlong of the way, and setting in motion hundreds of thousands of spindles. At Norwich it is obliged to take on its back a dozen propellers, and some of the most magnificent steamers that run to New York, and carry them to the Sound; and there, setting them afloat on the sea, it indulges in the rest and quietude which its eventful career has fully earned.

CINCINNATI has heretofore insisted on making a break in the railroads centering at that city in order that travelers through might be levied upon by the hackmen and hotels. The result has been disastrous to the interests of the city, and the papers are urging an improvement in this respect, and an endeavor is made, also, to procure a direct line to the south, by bridging the Ohio from Cincinnati across to Newport. The navigational interests of that section oppose the bridge, as it is feared that it will injure the navigation of a river which is at present none too reliable in the matter of floating facilities.

AMERICAN ART has suffered a serious loss in the death of Charles Loring Elliot, of Albany, the most eminent portrait painter which this country has ever produced. He began life as a clerk in a country store, but his innate love for art conquered his business faculties, and he soon applied himself to portrait painting, and achieved a deserved fame. His first sitters in this city were Mr. and Mrs. Cornelius Vanderbilt, for whose portraits he received fifty dollars each. His last ten pictures brought him seven hundred and fifty dollars each. We are glad to learn that he leaves his family well provided for.

A CURIOUS case of spontaneous combustion took place recently at Gaines, Michigan. Some cotton saturated in linseed oil that had been used as a dressing for a burn, was removed and thrown aside, when in a few hours it commenced burning spontaneously. Cotton or woolen covered with oil which oxydizes rapidly when distributed thinly over a great extent of surface has often been the source of disastrous conflagrations.

CAPTAIN STEVENS ROGERS who is said to have taken the first steamship over the Atlantic that ever crossed it, died recently at his residence at New London. Among his personal effects is a magnificent gold snuff box presented to him by the Emperor of Russia in honor of his success in the first experiment in transatlantic steam navigation.

THE propeller *Congress*, of Detroit, after fully testing the invention, has adopted and just commenced running with petroleum for fuel. The cost is half the cost of wood; while the oil to do the work of forty cords of wood can be carried in the space of four cords, leaving the space occupied by thirty-six cords for freight.

THE ties of the Chicago & Quincy railroad are all kyanized by immersion, for thirty hours, in carbolic acid, at 245°. They are, when so prepared, as black as charcoal, and believed to be practically indestructible.

THE number of threshing machines in the country is about 225,000, and they save five per cent more of the grain than the flail. There is a total to the credit of the machines of about 10,000,000 bushels annually.

FORGE VILLAGE, Mass., makes 1600 pounds of horse shoe nails daily, and the factory gains a profit of 1600 a month, which is at once returned to the works by increasing their capacity to the demands of their rapidly growing business.

ALLEGHENY, Pa., has a flowing salt well on one of its streets and though much of the water runs to waste, the owners make one hundred barrels of salt daily. They intend, soon, to work up the whole of the product of the well.

DETROIT is using a new invention for keeping the water in the boilers of steam fire engines in such condition that steam can be generated and the engine working in two minutes. The fuel used is coke, and the expense seven cents a day.

PITTSBURG is examining, with much satisfaction, a machine for undermining coal. The local papers say that it works easily, cheaply, steadily, saves coal, does not strike, and can go by steam, horse, or man power.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Mayo lode (Colorado), west of the Coin lode, is at present yielding silver ore that assays $965 to the tun.

The shaft on the celebrated Cornet lode is now sixty-five feet in depth, carrying three feet of pay ore.

The bar mining below Idaho has been seriously interfered with by the high water which is now subsiding.

The owners of the Equator lode, Colorado, have commenced shipping ore to Newark, N. J., for reduction on account of the limited facilities for shipment to Cheyenne.

The shaft in the Awanda lode, Leavenworth Mountain, is now fourteen feet deep. The vein is four feet wide carrying a very fine gangue thoroughly interspersed with mineral.

RAILROAD BRIDGE BURNED.—The Chicago and Northwestern railroad bridge at Sterling, Ill., 300 feet in length, was burned on 21st Aug. It will shortly be replaced.

PROSPERITY OF OUR RAILROADS.—The gross earnings of the principal railroads of the country for July of this year, exceed those of the same month of 1867 by about nine per cent.

SILVER IN THE ARTS.—It is estimated that one hundred thousand ounces of silver is daily consumed throughout the world, in the manufacture of silverware, watches, jewelry, photographs, and in the other manufactures and arts.

PERSEVERENCE AND INDUSTRY OF AMERICAN WORKMEN.—Several mill operators at Lewiston, Maine, are building houses in their spare hours. Working in the mills nearly twelve hours per day they manage to secure a little time before the bell rings and after they come out at night, which they devote to building operations. A short time ago one of these perseveripg men was seen shingling after eleven o'clock at night, and the next morning was at work almost before light.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the most prominent home and foreign patents.

GRAIN SCREEN.—J. H. H. Wiseheart, Shawneetown, Ill.—The object of this invention is to furnish a cheap and simple apparatus whereby grain may be thoroughly cleaned and separated from dirt, sticks, cheat, dwarfed kernels, etc., in an expeditious and convenient manner.

COMPOSITION FOR GRINDING MARBLE.—J. C. McAfee, West Alexander, Pa.—The manner of applying the sheets or plates of my improved composition to planes or polishing tools is represented by a longitudinal vertical section of such plane or tool, having a detachable shoe or sole formed of the composition.

STEAM GOVERNOR.—Thomas Alsop, Elkhart, Ill.—The object of this invention is to construct a steam governor, with its parts so arranged and operating, that if the belt slips, or an accident happens to the machinery, the governor will cut off the steam and stop the engine, in addition to properly performing its functions as a steam regulator at other times.

WARMING ATTACHMENT FOR STOVES.—John Fahrney, Boonsborough, Md.—This invention consists of an attachable and detachable horizontal iron rim which is to be used in connection with upright cylindriform stoves, for the purpose of supporting dishes, etc., around the stove, to be warmed by the heat radiated from its body.

LOW-WATER INDICATOR.—T. G. Eiswald and James Barbour, Providence, R. I.—The object of this invention is, so to construct a low-water indicator that the fusible plug, when melted, shall not be blown into the whistle, but shall be forced in another direction, so as to prevent the possibility of its obstructing or interfering with the operation of the alarm apparatus.

MILKING STOOL.—Otis Earl, Hermon, N. Y.—This invention consists in a clamping device, arranged to be closed and maintained in a closed condition, by the weight of the milker, in a sitting position on the stool, whereby the long hairs of the tail, being placed between the clamping jaws by the milker, before sitting down, will be clamped and held until he rises, when the jaws will separate and release the tail.

LET-OFF MOTION FOR LOOMS.—Benj. F. Carter, Manville, R. I.—This invention relates to improvements in let-off mechanism for looms, designed to provide means whereby the warp yarns shall be held rigidly against the action of the lay, while beating up, as is found to be highly necessary in weaving heavy goods, and, at the same time, permit the tension of the yarn to effect the delivery of the same after the lay has beaten up the weft.

PLANE.—George Buckel, Detroit, Mich.—The object of this invention is to provide a plane so arranged that the thickness of the cut may be regulated, either in a positive manner, or by the pressure of the hand, and that the bit may be raised out of contact with the board being operated on when it is being moved back.

MACHINE FOR FORMING RAISED PANELS.—F. D. Green, Williamsport, Pa.—This invention has for its object to furnish an improved machine for forming raised panels, so as to raise and finish a panel at one operation.

TRACE FASTENING.—Thaddeus Peck, Stratford, Conn.—This invention has for its object to furnish an improved device for securing traces to whiffletrees which shall be simple in construction, allowing the traces to be easily and quickly attached and detacked, and holding them securely in place.

CHURN.—C. N. White, Batesville, Miss.—This invention has for its object to furnish an improved churn, simple in construction, easily operated, in which waste in churning and the ingress of dust, or other impurities, are effectually guarded against, and which will bring the butter in a very short time.

SAWING MACHINE.—Peter S. Beidler, South Easton, Pa.—This invention consists of an arrangement of means for feeding an adjustable circular carriage. Also, an arrangement of means for automatically stopping the feed when the cants have been sawed through. Also, an arrangement of means for automatically varying the feed.

PLATFORM SPRINGS FOR VEHICLES.—Chas. D. Sutton, Tarrytown, N. Y.—This invention has for its object to furnish improved platform springs for vehicles, which shall be stronger, more durable, no heavier, and no more expensive than the ordinary platform springs, and which will allow the dratt to be attached lower down than it can be with the ordinary springs.

OPERATING BELT SAWS.—George Thompson, Nashua, N. H.—The object of this invention is to provide a means of operating belt saws, whereby the curve of the saw at the point of its operation on the wood may be varied to cut staves, lagging (so called), and other work of a curved character for which it may be applicable. It consists of a belt saw steadied by a number of adjustable small pulleys and running on a main pulley, which is driven by a driving belt which is so arranged upon several other pulleys as to hug the main driving pulley for half of its circumference, and by its friction against the same transmit motion to it.

WAGON BRAKE.—F. D. Ladenberger, Glenbeulah, Wis.—The object of this invention is to provide an effective wagon brake, which is operated in a simple and convenient manner.

AUTOMATIC FLY BRUSH.—B. F. Day, East Freedom, Pa.—This invention is a machine for actuating pendent brushes with a horizontal reciprocating motion, the motive power being furnished by a spring and train of wheel work. It is designed to be placed upon a table during meals, or at the side of a sick bed, to produce a gentle current of air and drive away flies, mosquitoes, and other annoying insects in the air.

AUTOMATIC LIQUID METER.—Charles H. Riggs, Warwick, N. Y.—This invention consists of a combination of floats and siphons arranged within a chamber to operate automatically in moving the registering mechanism as the water passes through the meter.

COUPLING FOR VEHICLES.—Chas. W. Greter, Three Rivers, Mich.—The object of this invention is to accomplish the abrupt or sharp turning of the front wheels of vehicles without jointing the coupling or reach pole of the same.

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HORSE COLLAR FASTENING.—W. A. Sharp and J. A. Shannon, Tama City, Iowa.—This invention relates to a new and improved method of constructing the collars of horse harness whereby many advantages over the ordinary method are secured.

SECTIONAL STEAM BOILERS.—Charles Bean, East Douglass, Mass.—This invention relates to a new and improved plan for constructing steam boilers whereby they are rendered more durable and more effective as steam generators than those of ordinary construction.

MACHINE FOR MAKING GINGER SNAPS.—Daniel M. Holmes, Williamsburgh, N. Y.—This invention has for its object to furnish a imple, convenient, and effective machine by means of which ginger and other snaps may be made from soft dough rapidly, conveniently, and accurately.

PIPE CUTTER.—John Peace, Camden, N. J.—This invention has for its object to furnish an improved tool for cutting off pipe, which shall be simple in construction and durable, and which will cut off the pipe quicker and better than the pipe cutters now in common use; cutting away the metal, and not leaving a burr upon either the outside or inside of the pipe.

CAR HEATER.—W. S. McNeil and O. S. Cadwell, Jr., Springfield, Mass.—The object of this invention is to so construct a heater for heating or warming railroad cars by heated air that the air shall be purified before it is heated and discharge into the car and properly distributed therein, and so that fuel shall be economized and proper provision made for protecting the passengers and car from injury from fire in case of accident.

HAND DRILL.—Alois Wirsching, Brooklyn, E. D., N. Y.—This invention relates to a new and improved drill, which is designed to supersede the ordinary bow drill, now generally used for fine or small work, by watch-makers, etc.

HORSE RAKE.—A. H. Robbins, Copenhagen, N, Y.—This invention relates to certain new and useful improvements on the ordinary wooden-toothed revolving horse rake; and it consists in a peculiar construction of the same, whereby the operator may control and operate the machine with the greatest facility, and the latter connected to a sulky or cart if desired, so that the driver or operator may ride if he prefers to do so.

GRAIN AND GRASS HARVESTER.—Amos Smith, Vienna Cross Roads, Ohio.—This invention relates to certain new and useful improvements in grain and grass harvesters, and it consists, first, in a novel and improved construction and arrangement of the driving gear; second, in a peculiar manner of applying the draft pole; third, in a novel manner of attaching or applying the finger bar to the machine; fourth, in a peculiar application of a lever for raising the finger bar; fifth, in a novel construction of the guards or fingers.

SOIL PULVERIZER.—Cornelius Berninger, Mier, Ill.—This invention relates to a new and improved device for pulverizing the soil, and it consists in a novel combination of a rotary toothed pulverizer, and a harrow fitted in a swinging or suspended frame, and attached to a mounted frame, all arranged in such a way as to admit of the soil being pulverized in an expeditious and perfect manner.

CORN-SHELLING MACHINE.—Geo. F. Johnson, Marshall, Iowa.—This invention consists in a rotary wheel provided with a central opening in which are provided a series of hooked shellers, having gages which press upon the cob to prevent the shellers from scraping the cob too deeply, the said shellers being provided with radial stocks, which slide on corresponding grooves in the rotary wheel, and surrounded by a spring which constantly bears them towards the center of the said rotary wheel A set of feeding rollers is also provided for grasping the cob after a portion of corn on one end of the ear has been shelled off, and drawing it through the sheller, the whole being actuated from a hand crank

LOCKING DEVICE FOR LOOSE PULLEYS.—William J. Linton, Detroit, Mich.—The object of this invention is to provide a simple and effective locking device, to be used in machinery, when pulleys or other wheels are required to run loose or fast on a shaft for locking or unlocking them.

JOINERS' PLANES.—F. Smith, and I. Carpenter, Lancaster, Pa.— This invention relates to improvements in joiners' planes, whereby it is designed to render the stocks less liable to warp, to regulate the weight of the same, to provide for a more perfect delivery of the shaving, adjusting the same to be used as a single or double plane, and adjusting the mouth so as to govern the width of the same, for the passage of the shaving.

SAW-SET.—W. B. Weaver, Reading Center, N. Y.—This invention relates to a new and improved saw-set, and it consists in a peculiar construction of the same whereby it may be readily adapted for setting the teeth of large and small saws, and also adapted for other purposes or uses than setting saws.

PUMP.—Jehyleman Shaw, Bridgeport, Conn – This invention consists in placing the ordinary lift pumps within a cylinder, provided at its lower end with a holding valve; the piston rods of the two pumps being connected by ends or chains passing over a pulley, and all arranged in such a manner that the device is made to operate as a force pump, and elevate water or other fluid to any desired hight, according to the amount of power applied to operate it.

CAR BRAKE.—S.W.Y. Schimonsky, Cheyenne, Dakota Ter.—This invention relates to a new and improved brake for railway cars and consists in a novel construction of the same, whereby the principle of the wedge is applied to the shoes, and the brake rendered self-acting and entirely self-locking. The object of the invention is to obtain a brake which will be efficient in its action, strong, and not liable to get out of repair, and which may be applied with a very slight effort or expenditure of power.

LAMP WICK.—Wilhelm August Gensch, New York city.—This invention relates to a new lamp wick, which is composed of animal and vegetable fibre, fitted together so as to be more effective and useful than those now generally made.

MACHINE FOR CUTTING MITER JOINTS —Frank A. Howard, Belfast, Me.—The object of this invention is to accomplish the cutting and fitting of miter joints for moldings, picture frames, and the like, in a perfect and expeditious manner. It consists in a sliding V-shaped cutter, composed of two shear edges and an adjustable V-shaped rest plate, together with other devices perfecting the whole.

CAN HOLDER.—M. M. Shurr, Delaware, Ohio.—This invention consists in the combination of expanding staves with a hollow box and staff sliding thereon, together with other devices perfecting the whole. It is used for holding cans to be soldered, and is designed as an improvement upon a machine for the same purpose patented by Henry P. Dennis (No 45,143).

PERMUTATION LOCK.—T. J. Sullivan, Albany, N. Y.—This invention relates to improvements for setting the combination of any lock having indented wheels, actuated by a knob bearing a graduated circle exterior to the lock, but is designed more particularly to improve a lock previously patented by the same inventor. The invention consists in attaching circular springs to the disks containing the combination wheels, said springs being each provided with a detent pin for detaining the combination wheels at any desired point, by fitting into the indentures of the same, together with other devices relating to and perfecting the whole.

SEWING MACHINE.– Robert Barclay, Buffalo, N. Y.—This invention relates to a new and improved sewing machine, and it consist in a novel feed mechanism and a take-up movement for the thread, whereby simplicity, economy in construction, and durability of the working parts are obtained.

FIRE GRATE.—G. H. McElevey, Newcastle, Pa.—The object of this invention is to so construct and arrange a fire grate and the plates and fixtures connected therewith, that the fuel shall receive a supply of oxygen from the back and ends as well as from the front and underside of the grate, and so that the heat generated shall be utilized instead of being passed directly to the chimney from the throat of the grate, as is ordinarily done.

WATER WHEEL.—P. H. Wait, Sandy Hill, N. Y.—This invention relates to a new and improved water wheel of that class which is secured on a vertical shaft and rotate in a horizontal plane at the lower end of a cylindrical case undern at chutes or water guides.

CAR COUPLING.—Leonard Monzert, New York city.—This invention relates to a new car coupling, of that class in which two jaws are employed for holding the connecting link, and consists in the application of a ring, which is fitted around the coupling box, and which, by being turned, serves to lock the jaws together, or to release them, to allow their opening, as may be desired.

WEAVING MACHINE.—Adolph Wagner, New York city.—This invention relates to a new machine for weaving hoopskirts and other fabric of suitable tubular or irregular shape, but is more particularly intended for the manufacture of petticoats and hoopskirts. The invention consists principally in the use of a circular machine in which the fabric is woven around a block suspended between the warp carriers and the track of the shuttles, said block being up and down as well as laterally adjustable, so that it may always be adjusted centrally between the shuttles however irregular its shape may be.

SMUT MACHINE.—Henry Stanley, St. Johnsbury, Vt.—This invention consists of an arrangement of fan-blowers within cases which are curved around the fans in the form of scrolls, into one of which the grain to be cleaned is admitted through the air passage to the fans, and from which it is forced by the blast of air around the scroll (the sides of which are perforated), to the mouth into a spout communicating with the next fan chamber, and in like manner forced from there to the mouth of the scroll, when it encounters another blast of air from another fan which is designed to separate the chaff.

MACHINE FOR ROLLING SAW LOGS.—Esau Tarrant, Muskegon, Mich.—This invention has for its object to furnish an improved device for turning or rolling logs upon the carriage of circular or other saw mills, which shall be simple in construction, effective in operation, and conveniently operated.

FIRE ESCAPE.—Thomas Tompson, Jr., New York city.—This invention has for its object to furnish an improved fire escape for permanent attachment to the outer sides of buildings, which shall be so constructed and arranged, that it may be conveniently lowered when required for use, and raised again out of the way when not required for use.

VULCANITE RUBBER BILLIARD BALLS.—For many years, indeed, since the game of billiards became popular, there has been a demand for a substitute for the ivory of which billiard balls are made. The game seems to demand a certain weight, a fixed diameter, and a degree of elasticity to the balls; qualities difficult to combine in their necessary proportions in any manufactured material. But Mr. W. H Lippincott, of Pittsburgh, Pa., claims by a patent obtained through the Scientific American Patent Agency, May, 12, 1868, to have succeeded in obviating these difficulties, and in producing a ball superior in some respects and equal in others, to those made from solid ivory. He says:—"Although a number of attempts have been made to construct billiard balls of vulcanized rubber, none have succeeded in overcoming the difficulties of thoroughly vulcanizing them. Balls vulcanized by single layers in square blocks, when turned, will be only one half the requisite weight, and are liable to be porous. By my process all the qualities of elasticity, density, weight, etc., are obtained, and the balls will last for years; cheaper in first cost, smooth as ivory, and not liable to chip, crack, or get out of truth. These balls are susceptable also of a high polish, and can receive any color desired" The inventor forms first a ball of say one inch diameter and vulcanizes it, then increases the size by successive vulcanizations until the desired thickness is attained. The constant expense for the renewing of the stock of billiard balls amounting for each table to $32 for eight sets per year, makes this invention worthy of attention.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

A. M. C., of Mo.—Is there any depth in the ocean to which an iron weight or bar would not sink. Ans. No.

E. B., of Pa.—Wire can only be properly coated with gutta-percha by machinery. For any small work, it may be coated by hand, softening the gutta-percha by immersing in water heated to 200° Fah.

S. H., of N. J.—The contraction and expansion of the spindle by heat and cold is sufficient to account for the fact you describe. We can supply some back numbers but not all; the rates are the same.

R. C., of Mass.—The pressure upon a closely fitted steam valve not covering any ports is as the area of the valve and the pressure of the steam When it covers ports it is the same minus the back pressure from the cylinder.

H. A. S., of Mo.—Owing to the variety of circumstances under which stones and bricks are used in building no general rule can be given for computing the strength of structures. Each case must be worked by itself. Mahan's Civil Engineering gives all the necessary tables and data.

J. H. W., of Mass.—Sheet iron plates are galvanized by first cleansing the sheets with dilute sulphuric acid, hammering, and scrubbing with emery and sand. The plates are then immersed in a bath of melted zinc covered with sal-ammoniac. Galvanized iron plates are simply iron coated with zinc. There are several other processes of manufacturing it.

H. A. S., of Me.—"Would coal tar on a roof injure the rain water caught from the roof when used for domestic purposes?" If the roof has been newly coated the taste will be perceived for a time, but it is in no sense unhealthy.

T. H., of W. Va.—This correspondent states that his steam boiler, fed with good, pure well water, after lying unused for a time, shows honey-combed holes filled with a "substance resembling black lead," and that his boiler leaks badly. He asks if an acid is present an alkali like soda or lime will neutralize it and prevent its deleterious effects. Either, we think, will do the business. It is evident that the water he uses is unfit for boiler purposes. Better procure water from a purer source.

W. M. G., of Vt.—This correspondent has a plan for setting off the divisions of a gear to be cut on an engine which seems to be novel, but the description sent is too obscure to be valuable. We advise him to insert an illustration of his device in our columns if he desires to introduce it to the trade.

E. H. H., of Mich., sends a plan for a gear cutting engine which has been in use for many years, and is not popular among machinists. His plan presents no novel features and its publication does not seem advisable.

C. B., of Iowa., proposes to build a five-horse power boiler thus: The shell a cylinder 12 feet long and 24 inches diameter with one flue 14 inches diameter, shell and flue to be connected at the ends with heavy cast iron rings 24 inches external and 12 inches internal diameter, to fit shell and flue, they are to be attached to the ring with tapped bolts instead of rivets. Set the boiler at an angle of about 30 degrees making one end a steam chamber, the products for combustion to circulate all around the shell below the water line and return through the flue its whole length to the chimney. The feed water pipe to run down through the flue—coiled if desired—and enter into the lower end at the bottom with check valve. "Do you think such a cheaply constructed boiler would be safe?" The plan is neither new nor safe. Similar boilers have exploded some months ago, one in Williamsburg, L. I., which we noticed at the time.

J. P. J., of Mass.—Paper of the proper sort is a good material for cleaning the face of a mirror or window glass, but the use of ordinary newspaper is not to be recommended. Much of the paper used for printing the common daily and weekly journals is manufactured from straw, which contains a large proportion of silex or flint, and the process of grinding, pulping, etc. is not sufficient to eliminate this substance. Consequently a glass often rubbed with newspapers exhibits in time a congeries of scratches, less pleasant to behold than dust or fly-specks, as flint will scratch glass, if it cannot cut it as the diamond.

B. J. P., of N. Y.—The business information you desire we cannot give, neither are we acquainted with the composition of "Zopissa" cement. We believe it has not yet been made public. Ammonia dissolves copper when exposed to the air. As long as it is thus exposed it has a splendid blue color, when not so exposed it becomes colorless. The copper in the former case is an oxide in solution, in the latter it is a dioxide. The process of making the solution of metallic copper being slow, the same solution may be more rapidly obtained by using the hydrated oxide. The statement that this solution will dissolve lignin has the sanction of good authority. Linseed oil is oxidized by heating it with lithage. Nitrobenzole is made by slowly adding benzole to fuming nitric acid gently heated; upon the addition of water the nitro-benzole separates in the form of a heavy yellow oil.

B. F. L., of Pa.—It is probable that you can obtain the work of Dr. Beaumont referred to in the article, of Lea & Blanchard of Philadelphia.

Business and Personal.

The charge for insertion under this head is one dollar a line.

For State and County rights to the best and cheapest sorghum stripper now in use, address C. P. Hale, Calhoun, Ky. Agents wanted.

Half the profits of a cotton gin that will add twenty per cent to the value of the lint, given to the manufacturers. Jas. S. Carnall, Lockhart, Texas.

Wm. G. Vermilye, 6 Park Place, New York, gives special attention to the manufacture of india-rubber articles for inventions.

Siccohast, that dryer for linseed oil, made in Boston by Mr. Asahel Wheeler, which so astonishes everybody who knows about paints—what is it? What does it impart to the oil? Simply causes oil to attract oxygen from the air and dry with the pigment upon the surface.

Metallic cartridge machine makers send circulars to J. V. Meigs, postoffice box 1031, Lowell, Mass.

Broughton's lubricators, for suet or oil, have none of the objectionable features which pertain, more or less, to all others. Manufactured by Broughton & Moore, 41 Center st., New York. Their gage cocks and oil cups are the best.

If you want to buy a factory with water power, read advertisement in another column.

Wanted—samples and price of native sumac. Address D. Miles, 95 Water st., Boston, Mass.

Pratt Brothers, publishers and printers, 37 Cornhill, Boston, will negotiate with writers for the publication of popular manuscripts, provided the authors will guarantee the sale of one-half the first edition.

Metal-edge card and show-bill manufacturers will please address H. C. Small, box 2169, Portland, Me. State whether the article is patented, and where the machines can be purchased.

A paying investment.—We are offering County and State rights. Also, manufactured goods of newly invented and patented household articles of great merit, at very low prices. On receipt of $1 75 we box and ship the above, nine articles, with directions and terms. Agents wanted everywhere. Send for samples. Marsh & Co., 33 Maiden Lane, N. Y.

Wickersham's American oil feeder, combining principles of the siphon capillary attraction, and filtration; saves 90 per cent in oiling journals; perfectly reliable; always under control. J. B. Wickersham & Son, 143 South Front st., Philadelphia, Pa.

Those prepared to manufacture the beam steelyard please address H. Maranville, Akron, Ohio.

Machines for boring, turning, and slotting pulleys, mill gearing, and turbine water wheels, ten feet diameter and under,—about half the cost and does double the work of a lathe of same swing. Gear cutters of new and improved pattern, to cut gears 8 ft. diameter and under, and all kinds of machinists' tools. Send for circular to L. W. Pond, 98 Liberty st., New York.

For descriptive circular of the best grate bar in use, address Hutchinson & Laurence, No. 8 Dey st., New York.

Peck's patent drop press. Milo Peck & Co., New Haven, Ct.

Parties about to buy steam boilers should examine Root's wrought iron sectional safety boiler at 95 and 97 Liberty st., New York. See advertisement.

Spring-bed bottom—unequalled for simplicity, cheapness, and durability. Manufacturers wanted as agents. Address S. C. Jennings, Wautoma, Wis.

Moss' improved compound oil for use in the manufacture of woolen goods, and the greasing, carding, cleansing, and spinning of all kinds of wool is the greatest invention known. Address Moss & Lindsey, New Richmond, Ohio.

N. C. Stiles' pat. punching and drop presses, Middletown, Ct.

For sale—just finished—an 18x42 Wright engine. Address Merrick & Sons, Philadelphia, Pa.

For sale—the whole or a part of a paper mill, all new machinery. For particulars address L. A. Beardsley, Fredericksburg, Va.

For sale—the patent right, in Great Britain, for perforated saws. The manufacture of these saws is now firmly established in the United States, and they are rapidly taking the place of all other solid saws. Apply to J. E. Emerson, Trenton, N. J.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

For breech-loading shot guns, address C. Parker, Meriden, Ct.

Wanted—a second-hand steam hammer. Norway Manufacturing Company, Wheeling, W. Va.

NEW PUBLICATIONS.

HANDBOOK OF THE STARS, for School and Home Use. By W. J. Rolfe and J. A. Gillett. Boston: Crosby & Ainsworth. New York: Felt & Dillingham, successors to O. S. Felt.

The study of astronomy is of all others most calculated to enlarge and elevate the mind. Descriptive astronomy is particularly adapted to interest youth, and can be pursued advantageously without a previous knowledge of the higher mathematics. The little work before us is designed to aid the school and family in this important study, and seems well adapted to the purpose. It has maps of the constellations, including all the stars down to the fourth magnitude, with a table of all the constellations visible during each month, and full instructions as to their location, their history and mythology. The book is printed and bound in superior style. An additional attraction is its description of the spectroscope and its use in the study of the heavenly bodies.

THE WORKSHOP.

We are in receipt of the seventh number of "The Workshop," containing besides its usual amount of useful and artistic designs, some very entertaining and instructive remarks upon the subject of antique vessels, and a valuable article on the "Employment of Calcareous Tufa for the Production of a Fine, Artificial Marble."

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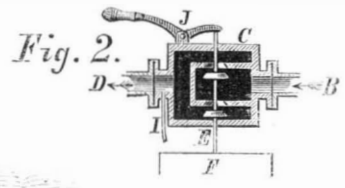
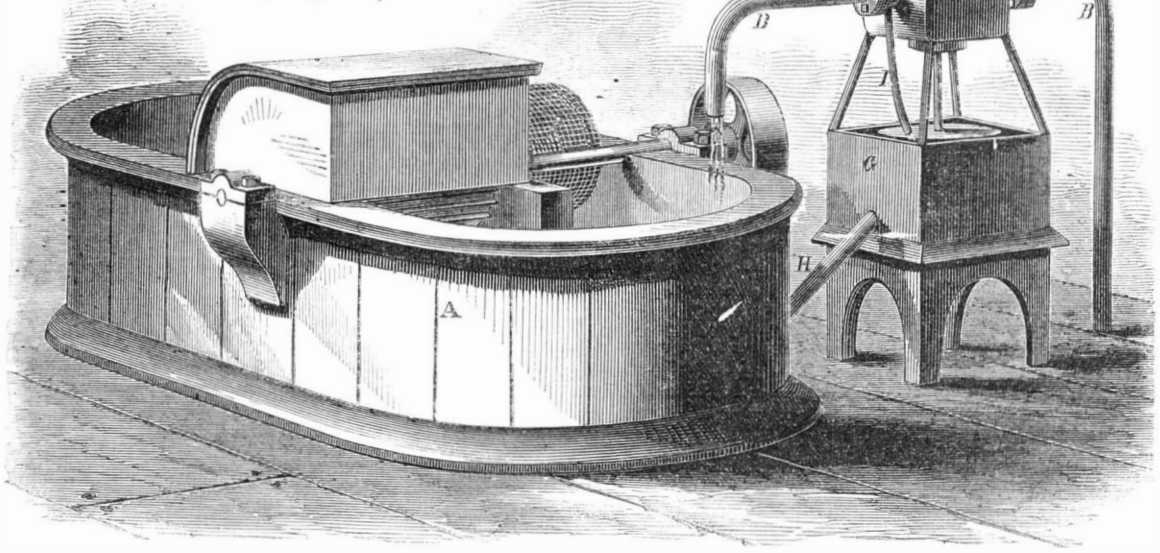
Device for Regulating the Flow of Water to Pulp Engines.

Annoyance and waste of stock is sometimes caused in paper making by the overflow of the engine tank, or by the insufficient supply of water. The design of the improvement herewith illustrated, is to prevent the occurrence of these difficulties by furnishing an automatic feed for the water by means of which the supply shall be regulated and governed by the level in the tank.

A, is the usual tank, shown empty in the engraving. B, is the supply pipe, by which the water is led to the regulator, C, from which leads the delivery pipe, D, that conducts the water to the tank, A. The interior of the regulator, C, is shown in the section Fig. 2. It will be seen that the water is admitted from a proper head, in the direction of the arrow at B, to a chamber, the walls of which extend across the regulator, and are pierced at top and bottom by apertures forming valve seats in which fit downward opening valves secured to a rod, E, to the lower end of which is attached a suitable float, F, sustained on the surface of water in a reservoir, G; the level of the water in the reservoir being kept at the hight of that in the tank by means of a connecting pipe, H. A dip pipe, I, leads any surplusage of water from the regulator, C, to the reservoir, G, and a lever, J, Fig. 2, may be attached to the top of the regulator, C, to open the valves by hand, if at any time it may be deemed necessary.

Fig. 2.





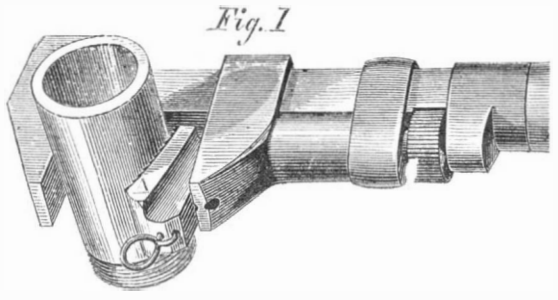
HUNTER'S PAPER ENGINE WATER FEEDER.

From the foregoing the operation of the device may be readily understood without further explanation. It was patented through the Scientific American Patent Agency, by David Hunter, North Bennington, Vt., to whom all communications relative to the device should be addressed.

FARIES' PATENT SUPPLEMENTAL JAW FOR SCREW WRENCHES.

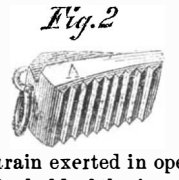
The object of this device is to provide a handy auxiliary jaw for the common screw or monkey wrench, by which the

Fig. 1



ordinary wrench may be used for screwing up bolts by gripping their cylindrical surfaces or for piping purposes instead of the gas-piper's tongs. Its value as applied to these uses is apparent at a glance.

Fig. 2



The supplemental jaw, A, seen plainly in Fig. 2, is a wedge-shaped block slightly curved on face and back, the face being corrugated or toothed to give a better hold on the work, the serrations being so inclined that the greater the strain exerted in operation the more determined and positive the hold of the jaw on the work. A ring is fastened in the supplementary jaw by which it may be linked to the movable jaw of the wrench or suspended to the wrist of the operator if working on elevated places or in pits or excavations. In consequence of the slight curve given the auxiliary jaw, the points of bearing on the pipe, shaft, and the jaw of the wrench are directly in line with the force exerted, so that there is no transverse or wrenching strain tending to injure the wrench. It can be applied to or used with any ordinary wrench.

Patented June 23, 1868, by Robert Faries, who may be addressed for territorial and manufacturing rights, or the device itself, at Decatur, Ill.

Erie Water Works.

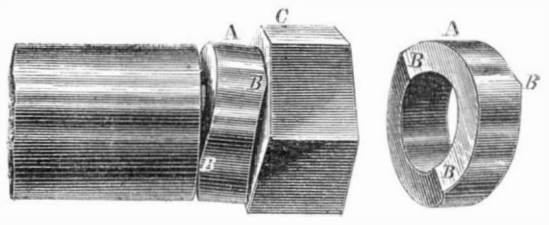
The people of the thriving city of Erie, Pa., have been for years dependent for their supply of water on local wells, aided by an inefficient system of supply furnished by a limited and unreliable congeries of pipes fed by springs of small capacity. But it is soon to be supplied from the pure waters of Lake Erie, than which no better water for drinking, lavatory, or manufacturing purposes is in use. The plan, under the superintendence of H. P. M. Birkenbine, a well known Philadelphia engineer, is to erect on the shore of the lake an engine house and stand-pipe, the latter of sufficient hight to provide a head capable of supplying the most elevated portions of the city.

The *Erie Dispatch* says: "The stand-pipe rises 234 feet above the level of the water, and stands on a rock 14 feet high, making the pipe 220 feet high; it is five feet in diameter, and is made of boiler iron 3-16ths of an inch thick at the top and 7-16ths of an inch at the bottom; it weighs 42 tuns. This is to be surmounted by an ornamental spire of bright metal fifteen feet high. This is the highest pipe on the continent, and probably in the world. It was raised in a very novel manner, the invention of the contractor, and is well worthy of a patent. It was done very much as the Irishman proposed to build a chimney, 'hold one brick up and put another under it.' It was done by commencing with the top section and adding the lower sections in their regular succession, hoisting the pipe as each section was added, by means of derrick and pulleys.

"Around this pipe is to be built a tower 9 feet 6 inches from wall to wall, and 190 feet high from the rock, surmounted by a balcony five feet wide. The balcony is reached by a spiral stairway of 250 steps. The stairway and pipe will fill the entire space in the tower. The tower will be of stone 22 feet, and the remainder of brick. The engines are of the Cornish pattern. Their cylinders are upright, and are 60 inches in diameter and 10 feet stroke. The cylinders themselves are of immense weight. The pistons work directly in connection with the pump rods. This connection is made in the lower or middle story. The pumps are in the basement story, placed directly under the engines. They are 21 inches in diameter and 10 feet stroke, and are capable of pumping 2,000,000 gallons each in 17 hours. Adjoining the engine house is the boiler house, which is 50 by 60 feet and one story high, made of brick. In this will be eight boilers, 30 feet long and 42 inches in diameter, with two 14-inch flues. They rest on brick and stone work, built up from the solid rock. Each boiler will be independent of the others, so the stopping of one will not affect the others. The fire will not be under the boilers, as is commonly the case, but will be in front of them, in combination chambers. The smoke stack is to be 100 feet high."

BOARDMAN'S DEVICE FOR FACING NUTS.

The accompanying engraving is a perspective view of a convenient little device for turning or facing nuts. It consists in providing a loose ring, A, with two rounded projections, B, on either side and at right angles with each other. This ring is placed on the screw-arbor between its shoulder and the nut, C, to be turned, and adapts itself to the irregular shape of the nut's rough surface, making an equal pressure on its opposite sides directly endwise with the arbor, and perfectly true with the thread. The engraving shows the ordinary style of arbor at one end, and the improved arbor and ring on the other.



The style of arbor now in use is shouldered down below the bottom of the thread, to allow the nut to be faced to screw up to its shoulder, and when the highest point of the nut strikes on one side of shoulder, and is screwed up hard enough to turn or face up the nut, the arbor will spring and the nut will cramp over on the few remaining threads of the arbor, and be faced out of truth. This improved arbor gives a thread bearing to the nut its entire length, and is not weakened by having the thread turned off, but is left full size of outside of thread. This invention was patented April 21, 1868, by Byron Boardman, of Norwich, Conn., and assigned to himself and Frank Douglas of the same place. For further information, or the patent rings, address Frank Douglas, Norwich, Conn.

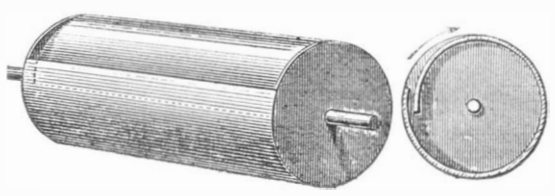
Carbolic Acid a Cure for Snake Bites.

The following extract from a letter written by John W. Hood, M. D., from Australia, gives the results of the application of carbolic acid to the cure of bites of poisonous snakes:

"An unfortunate experiment, resulting in the death of the principal performer, as to the efficacy of a so-called antidote for snake bites, took place here some few weeks since, and of which I send you a report. The cure of persons bitten by the venomous snakes of Victoria has long been a favorite subject for experiments among the medical profession here. I, living in a city, have not the opportunity of meeting with any human subjects to experimentalize upon, and have to rest contented with quadrupeds—most of which suffer death. However, I have long entertained the opinion that carbolic acid, taken internally and used as a caustic to the wound, would be found to be beneficial, and, perhaps, a specific cure. That I am right, to a certain extent, is proved by the fact that a friend of mine, a medical man living at Warranambool, Dr. Boyd, successfully treated two cases of snake bite with carbolic acid. I am not aware of more particulars than that the first case was a young lad bitten by a tiger-snake, the most venomous these colonies produce, and Dr. Boyd, six hours after the boy was bitten, administered ten drops of pure acid, in brandy and water, every few minutes. He writes: 'The effect was magical—from a pallid countenance, slow pulse, and semi-comatose condition, the patient rallied to a bright expression, ruddy glow, and quick pulse, and the recovery, though slow, was continuous and certain.'"

IMPROVED TUMBLING BARREL AND COAL SIFTER.

The tumbling barrel is a very efficient means of cleaning small castings from sand, and brightening and polishing small metal work of all descriptions more effectually and much cheaper than can be done by hand. It is a cylinder suspended on an axle and having an aperture for the reception of the work to be cleaned, which may be closed and secured when the barrel is charged. For large work and where the tumbling barrel is kept nearly constantly in operation, it is built quite heavy, the staves being strong ribbed iron castings and the heads made to correspond, the whole bolted firmly together; but for light work an ordinary barrel or wooden



cask is used, or a square cornered box of wood is swung on journals and rotated. But all of them must have a door or trap which has to be secured so that none of the contents can escape while the barrel is performing its revolutions. Evidently there are objections to the ordinary tumbling barrel or rattling box, as time is required to open and close the aperture, and, as it is generally situated midway between the heads and the barrel is usually cylindrical, it is not easy to deliver the contents.

We present herewith a plan which we consider an improvement on the ordinary tumbling barrel. This one is always closed, and yet always open. Instead of being a cylinder it is in cross section a scroll, as seen. So long as the barrel rotates in the direction of the arrow its contents will remain inside, but if stopped and turned in the other direction until the aperture comes underneath, the contents are readily discharged. One advantage of this plan is that the opening extends the whole length of the cylinder and the contents drop at once from the whole of the interior. Facility of charging is another advantage, and the projection inside, of one edge of the casing over the other, makes a fall for effectually rattling and mixing the contents. The inner edge should pass the outer only sufficiently to prevent the escape of the contents.

As a coal and ashes sifter, flour and meal bolt, for sifting molding sand, etc., this device is equally well adapted, a wire screen or bolting cloth taking the place of the solid covering used in the tumbling barrel. It may be constructed of any material, wood or iron, boiler or cast, and still preserve its form and its advantages.

We do not claim to have originated this device, but received it from an enterprising mechanic, Mr. Boynton, formerly of Hartford, Conn. We believe there is no patent on its application, and we deem it worthy the attention of foundery men, hardware manufacturers, and others.

AN Ohioan has invented a car brake which acts directly on the axle, instead of the wheel. It is asserted that it will, by a quarter turn of the brakeman's wheel, bring a car to deadlock, and that a train can be stopped instantly, though that, of course, would destroy the train.

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Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN. S. H. WALES. A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York.
☞ "The New York News Company," 8 Spruce street.
☞ A. Asher & Co., 20 Unter den Linden, Berlin, are Agents for the German States

VOL. XIX., No. 11...[NEW SERIES.].... *Twenty-third Year.*

NEW YORK, WEDNESDAY, SEPTEMBER 9, 1868.

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THE INCREASE OF DISEASE AMONG DOMESTIC ANIMALS.

A very cursory examination of agricultural statistics and reports of different organizations relative to the diseases of domestic animals, brings prominently to view the fact that these diseases are on the increase. The causes which engender this augmentation of disease are an interesting and important subject of study. Some light may be thrown upon it by a consideration of the origin and progress of human diseases, with which the diseases of animals are in many cases identical, and in other instances bear so strong a resemblance that the principles of general pathology may be considered as equally applicable to both.

The medical faculty are generally agreed that, in the human race, diseases originate largely from the artificial habits of civilized society, which, although many of them really conduce to health, as cleanliness, the absence of the peculiar privations attending savage life, etc., are attended with practices contrary to the laws of health.

The congregation of people in large cities, high seasoned food, artificial stimulants, sedentary habits, etc., are fruitful causes of disease. Among the very poor inhabitants of large towns, the want of proper ventilation, light, and food, adds to the catalogue of "ills which flesh is heir to."

If we examine the mode of feeding, stabling, and breeding cattle, we shall find some of the same causes of disease in their improper management. Dark, ill-ventilated stables; too stimulating and concentrated diet; the crowding of animals in large herds and pens, are countertypes of the causes of human disease. These causes are well recognized among breeders, and we shall therefore not dwell upon them. Our object is to call attention to a fact which has its analogue in the culture of vegetables. The diseases which have from time to time made such havoc with the potato, the hop, and other plants largely cultivated, have been ascribed to over-cultivation. Not that over-cultivation is the direct cause of disease, but that the constitutions of the plants in question have become so weakened by it that they have thus been rendered susceptible to causes which otherwise would be resisted.

The practice of breeding stock in order to develop particular qualities, is, we believe, fraught with danger beyond a certain point. It is all very well to have horses that can trot in 2:30; hens that lay but will not set; sheep that will furnish a large fleece of a desired quality, or cows that yield thirty pounds of milk per diem, if these qualities can be obtained without the risk of initiating diseases that rage indiscriminately among, and ravage our flocks and herds, destroying alike good and bad. We do not believe that this result of the inter-breeding, so much in vogue among our most celebrated breeders, has attracted sufficient attention, or that the constitutional peculiarities and idiosyncracies of highly bred animals have been sufficiently observed. Now that the attention of the world is attracted to the epidemics and contagions that are making such havoc, raising the price of food and rendering people suspicious of its effect upon the health of mankind, this point demands immediate and thorough investigation.

THE SANITARY CONDITION OF WORKSHOPS AND MANUFACTORIES.

A foolishly incorrect idea is generally prevalent that confinement inside a manufactory of any kind is detrimental to health, whether it be a machine shop, foundery, one of the hundred-and-one establishments for metal working, for wood working, or the cotton or woolen factory. Few manufacturing employments are necessarily unhealthy, and the confinement itself we do not believe to be either unhealthy or irksome. To be sure, there are some departments of the work, perhaps, in each, which are not entirely pleasant, and, possibly, which, if long followed, might prove detrimental to bodily health; but, on the whole, mechanical pursuits are not more unhealthy than mercantile, or strictly out-door employments. It may be unpleasant to polish, day by day, at an emery wheel, to attend a gig saw, to manage a picker or set of cards in a cotton mill; but even in these extreme cases we believe much has been done to reduce the annoyance and mitigate the evil, if any existed.

On a visit, a few days ago, to South Norwalk, Conn., we spent an hour in the shops of the Norwalk Iron Works. Beautifully and pleasantly situated on a salt water estuary, close to Long Island Sound, the welcome breezes coursed through the many windows, making a cool retreat on one of the hottest days of the season. The buildings are pierced with windows, more than are necessary for light, but intended also for ventilation. Along the walls of the machine shops are the vise benches, next a single row, on each side, of lathes, planers, drills, shaping machines, etc., leaving the whole center free, encumbered with nothing more than piles of work in progress. The consequence is, clean, clear, well ventilated and well lighted rooms, giving the advantage of free, unobstructed locomotion, permitting the ingress of the cool salt breezes, tempered by the warm sun outside, whose too fervid rays could not reach the toilers inside the buildings. Toilers, did we say? Pleasant is their toil with such inducements to comfortable work. It is no wonder, that, as Mr. Earle, the manager, says, his men choose to spend their Sundays during the hot season of this summer in the shop, rather than at their homes, conducting religious exercises on their "own hook," combining comfort with moral and religious instruction.

Here are employed not only the brawn—the muscle and sinew—of the locality, but no small modicum of the brain, the intellect of Norwalk. We could not help but notice, in conversing with the "hands," the aptness of apprehension, the promptness of reply, the independence of thought, and the general physical and mental health of these enviable American citizens. They were as well "booked up" and "posted" on the news of the day, and on the

"Great thoughts that move mankind,"

as those who make the news and those thoughts their specialty. Indeed our columns bear witness, in their published communications, that our mechanics are frequently not only as close thinkers, but as deep and earnest investigators as those who work only with the pen. These workmen, employing their shop hours in the production of pumps, use their leisure in improving their minds, and acquainting themselves with the state of local and national politics. Individually they exercise a large power. Could they do it if herded and crowded together in an ill-ventilated shop from whence they would go exhausted to a supper and bed? And could they properly and intelligently do their work if they returned in the morning to a close, unventilated shop? Decidedly not. A clean, airy workshop is an advantage to employer, employed, and the public generally.

A late visit to the works of one of the largest cotton corporations in Lowell, Mass.,—the Boott—served but to confirm us in the idea that the provision of clean, airy, and comfortable rooms is pecuniarily profitable to the proprietors. Clear heads and cheerful minds conduce not less to intelligent labor than to bodily comfort, and acting on this idea, the managers of these vast establishments have wisely applied the proper means to this end.

PAPER COLLARS.

Some querulous person once wrote to a public journal that the pleasure of the tourist was all but spoiled now-a-days, by the prevalence of paper collars. At first this complaint seems ridiculous, but the gentleman had traveled some, and doubtless spoke from what he had seen. If you open the window of your hotel and look down into the court, dirty paper collars, torn and worn paper collars, collars new but burst at the button holes, collars in all states and conditions, meet your first glance. If you take the wings of the express train and the depths of the White Hills pierce, you are certain to meet with paper collars in the most quiet and retired nooks. They bestrew the landscape far and wide, they are encountered, trodden under foot of man at picnics, people drop them behind sofas in waiting rooms, leave them in company with worn out toothbrushes, as legacies to waiters, denude themselves of paper collars as crabs do their shells; so that they are found floating about the world, waifs and estrays from the wardrobe, the most useless of all rubbish with but one exception—the hoopskirt.

The quantities manufactured every year will astonish those who have never given the matter a thought. So very general is the use of them, that large factories and many hands are employed the year round upon them. We lately visited such a workshop in Springfield, Mass., and brought away a few statistics in relation to the trade which will give, so far as figures can, an approximate idea of the extent of a novel branch of industry.

Of course the first thing is to get the paper. This is made specially for the purpose, of a peculiar stock and color, and is furnished in sheets about eighteen by thirty inches, as near as we could estimate by the eye alone. These are piled one upon the other in varying quantities, from 100 upwards, and placed under a machine which is really nothing but a press. A die, or knife, above, the exact shape the collars are to have when cut out, is forced through the sheets, and stamps a collar complete out of every one. This merely shapes the outside. The button hole patches, which are made of cloth, are now applied. This is a simple process apparently, but it is the work of a very ingenious machine and a pretty girl conjointly. The machine does its part, which is simply to stamp out oval patches from a sheet of gummed cloth led over the machine like paper in lithographing, and the pretty girl does hers by feeding the collars in continually, so that each one is ready for the machine to operate on. When the patches are put on, the collars are much stronger, and not so liable to tear out at the holes. These are subsequently punched at another machine, through the co-operation of another pretty girl. In fact, the whole operation of manufacturing paper collars is a series of ingenious and effective machinery attended by pretty girls.

After these processes are gone through with, the collar is folded, also on a machine; and then rolled, to give it a sharp edge and make it lie close to the neck.

One of the most curious processes, however, is the embossing, or that which gives the linen finish. Paper collars now-a-days look exactly like linen, and the process, which is secret, through which they are put, infallibly produces the desired result.

These details will give an idea of the mere hand-work connected with the trade, a very inadequate one, however, as all details do. It is necessary to walk through the factory, visit different rooms, and see stacks of the finished product before one can realize what an immense trade there is in what seems a trivial affair.

Messrs. Ray and Taylor, our informants, stated that they made last year 16,000,000. and beside them there are some thirty or forty other makers. One would suppose a large force would be required to supply those left in hotels alone.

Those who are looking forward to the good time, when woman shall be man's equal in the market of labor, would think that a long step had been taken toward that end, if they could have seen these Yankee girls at work in this factory. They sat at their work apparently contented, certainly clean and intelligent looking, earning a fair rate of wages, say from six dollars to eight dollars per week of ten hours. This at noiseless, unfatiguing work, except as regards monotony, and in a room where there was plenty of light and air, with enough manual labor to keep the blood from stagnating, and the brain from getting stupid. These places are at a premium, for Mr. Ray informed us that he could get an entire new set of hands if he chose, in twenty-four hours.

The lace patterns of paper collars and cuffs for ladies wear, are chiefly made abroad; and the delicate tissue of the thinner parts is given simply by color, while the flowers are embossed by pressure between dies.

One cannot fail to be struck by the economic results derived from a division of labor. Here is an article which requires large capital, a heavy force of employés, and extensive workshops, many operations, and yet sells for a cent and one half each, that is, ten in a box at fifteen cents per box. Countless thousands of collars have to be manufactured before a satisfactory dividend can be made; and this calculation we offer to the statistician.

IRON RAILS ON COMMON WAGON ROADS.

American wagon roads are proverbially bad during a large portion of the year. In spring, while the frost is coming out of the ground and until they are settled by the vernal rains, they are for heavy loads well nigh impassible. Nothing is more common at that season than the spectacle of a wagon sunk to the hub in some slough of despond, with its attendant driver up to his knees in mud, vainly endeavoring, by the aid of some fence rail borrowed for the occasion, to pry it out, at the same time shouting in terms far from elegant to his bedraggled and exhausted team. In the fall the rains having first changed the consistency of the earth into mortar, the frost consolidates the ruts formed by the wheels, so that there is scarcely any choice between the state of the roads at that season and the spring mud. During the summer any heavy rain breaks up the highways into gulleys, and also approximates them to the delectable state which they assume at the close of winter.

There is no work done by the people that is more remunerative than the repair of public roads and none that is more grudgingly performed. The prevalent custom among the agricultural population is to work out the road tax annually levied, and this work is too often a mere sham, the time being allowed by the path-masters while no corresponding amount of labor has been performed.

Some years since when the plank-road experiment had proved a failure in this country, a good deal of discussion took place in regard to the permanent improvement of roads., and among other things it was suggested that iron rails upon which the wheels of ordinary wagons might run would prove the best means of effecting the desired object. Horse railroads were then in their infancy. The experience which has been gained since that time has proved their durability. The expense of construction and repairs has been shown to be even less than that of a first-class McAdam road, while the wear upon vehicles and horses is less.

The proposition to construct common roads upon this plan is favorably viewed in England. The London *Times* recently published a communication strongly advocating its adoption upon the entire road system throughout the Kingdom, and demonstrated its entire practicability for all sorts of soils, including bogs and mucky deposits. It also shows that to lay such roads throughout the Kingdom would cost only one-half as much as the steam railways now in operation in that country. It advocates the adoption of locomotive engines of a particular type, but we think that for public highways this is generally impracticable. What we want in America is that our principal highways should be in good condition at all seasons for vehicles drawn by horses, and this result can doubtless be secured by a railway differing in no important particular from those in use in the streets of the large cities

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in the United States. We believe such roads would prove remunerative, and at once be viewed with favor in many localities as a substitute for the plank roads which have so generally proved a disappointment.

WHITE GUNPOWDER.

White Gunpowder is again receiving attention; a result no doubt attributable to the failure of most of the explosive compounds, to supersede ordinary gunpowder for fire-arms. For blasting, some of these compounds have been shown to be of great value; but their adaption to this purpose on account of the suddenness and violence of their explosions, renders them unfit for use either in large or small fire-arms. It is a settled principle in gunnery that an explosive agent should not burn instantaneously in a gun, to act most efficiently as a projectile agent; and in proportion to the size of the guns in which ordinary gunpowder is to be used, its method of manufacture is modified to insure its burning with sufficient tardiness to impart its force to the ball as uniformly as possible until it leaves the mouth of the gun.

In the manufacture of all these substances except the white gunpowder, there is more or less danger. Taking this fact into consideration, if the white gunpowder can be shown to act with equal or greater efficiency, to be as cheap or cheaper than the black, and not injurious by its chemical action to the mechanism of fire-arms, it ought to be adopted without hesitation. Has this been satisfactorily proved? We think not; yet we are far from believing that it cannot be. That it is well adapted to small arms is quite possible, but that it is equally fit for heavy artillery is we think open to question. Having ourselves made and experimented with this powder, we believe it to be, notwithstanding the statements published in regard to it, much quicker in its combustion than the artillery powders manufactured in this country. Having said this we are prepared to admit that it seems possible to so modify its composition as to make it sufficiently slow, but at the same time we think its explosive force would be weakened, so that it would be little if any superior to common artillery powder. But if equal to the latter in energy that is enough to establish its value, provided it can be made without danger and cheaper than black gunpowder.

That this can be done will be evident from its composition, and the mode of making it. It consists of Chlorate of Potash, 48 parts; Yellow Prussiate of Potash, 29 parts; Finest Loaf Sugar, 23 parts. The yellow prussiate should be dried in an iron ladle until it is as white as the chlorate of potash. All the materials should be separately pulverized. If the same mortar or mill is used for each, it should be cleaned after each substance is ground. The materials are then mixed by sifting them over and again to insure uniformity. All trituration in mixing should be avoided. Made in this manner there is not the slightest danger. It should not be rammed hard but pressed down solid by the ramrod. Only a little more than half as much will be required for a charge as of the ordinary powder. Although it should cost somewhat more in the first instance by weight than black gunpowder, when compared in regard to efficiency it would be cheaper than any powder in market; but on account of its not being granulated, it should be used in cartridges. These cartridges can be made, by persons of ordinary ingenuity, of paper or gut, and will obviate the difficulty which would be otherwise experienced in obtaining equal charges in the ordinary manner from a flask, arising from the non-granulation of the powder. An ordinary flask would not be adapted to carry it, as its mouth is so narrow that it would be difficult to get the powder in or out.

EXAMINERS TO BE EXAMINED.

Commissioner Foote contemplates making a thorough examination of the qualifications of the Examiners in his office, and to weed out all inefficient officers. There are about 40 persons to whom the higher duty of examining into the merits of inventions is intrusted, and all who are found deficient in qualifications are to be discharged. The Examiners receive higher salaries than those performing clerical duties, the policy being to excite a laudable ambition in the latter class. The Commissioner intends, also, to give the latter the preference in a competitive examination for the places of such Examiners as may fall short of the standard of qualifications.

That is good; and we have no doubt, if the examination is properly made, the Commissioner will find among the really good men some dunces who might be better employed in other business. We hope this examination will be extended throughout the whole official force, and if there are any Examiners or employés who are interested in the success of patent agencies or attorneys either at Washington or elsewhere they should be discharged. There is already a strong suspicion that some clerks are unfaithful to their trusts.

THE BOWERY EXPLOSION.---THE ENGINEER'S DEFENCE.

The explosion of the boiler of one of the metropolitan steam fire engines, at a fire on the Bowery, New York city, is still fresh in the recollection of our readers. It will be remembered, also, that the engineer, Mr. Patrick W. Hand, who was severely injured by the explosion, was censured by the coroner's jury and the daily press. He has lately published a certificate of his abilities as an engineer and a demand for a more thorough investigation into the causes of the explosion, with a view to his vindication, signed by a number of practical mechanics. We think Mr. Hand's proposition for an investigation by a committee of engineers should receive consideration, as his reputation as a mechanic cannot but be greatly injured by the imputation of incapacity conveyed by the strictures of which he has been the object.

OUR PLANET—ITS PAST AND FUTURE.

The above is the title of a very interesting little volume published by William Denton, Boston. It is a series of eight lectures on geology, in the popular style now so much in vogue, and is well calculated to bring science down to the level of the masses. These lectures seem to do this very successfully. They abound in vivid description, and are as far as may be, freed from the technical character of more extended works. The following extract, intended to show that the resources of modern civilization will prove sufficient for the future necessities of mankind, is a good specimen of the style of the work:

"As long as the world exists, then, we may be assured that man's ingenuity will keep pace with his necessities, and the human race march on to the goal that lies before them.

"Man is an important part of Nature; and his importance increases hourly. At first a helpless log, he floated on the stream, but now stems the current, or boldly directs it.

"If the land-surface of the globe should not increase naturally in the future, as we have anticipated, man's agency would, without doubt, bring it to pass, as is evident from what he has already accomplished.

"In Lincolnshire, England, four hundred thousand acres of fever-and-ague-breeding swamp-land have been transformed into fields of wheat, barley, and oats, and excellent meadows. In the Netherlands, lands lying still lower than the fens of Lincolnshire, and apparently much more hopelessly doomed, have been reclaimed, and become among the most productive. It has been calculated that nearly nine hundred thousand acres have been gained there by diking and draining. 'The province of Zealand consists of islands washed by the sea on their western coasts, and separated by the many channels through which the Schelde and some other rivers find their way to the ocean. In the twelfth century, these islands were much smaller and more numerous than at present. They have been gradually enlarged, and, in several instances, at last connected by the extension of their system of dikes. Walcheren is formed of ten islets united into one. At the middle of the fifteenth century, Goeree and Overflakkee consisted of separate islands, containing altogether about ten thousand acres. By means of above sixty successive advances of the dikes, they have been brought to compose a single island, whose area is not less than sixty thousand acres.'

"A few years ago, an English gentleman purchased for a trifling sum a small island which was covered by the sea every flood-tide, but left dry at the ebb. He enclosed it with a bank of earth thirty feet wide at the bottom, and seven feet high and four feet wide at the top, with a slope on the outside having two feet horizontal to one perpendicular. This wall, about two miles and a half long, encircled the island, except a gap about seventy feet wide, through which the tide flowed in and out. Earth was at first used to close the gap; but the sea swept it away as fast as it was thrown in Piles were then driven in a double row, and clay rammed in between them. This succeeded, and the little island was drained. In time, excellent crops were raised upon it, a house and barn built, and nearly three hundred acres of land, by the energy of one man, won from the sea.

"The draining of Lake Haarlem is one of the best examples that we possess of man's disposition and power to change water-surfaces into dry land; and is at the same time a prophecy of what will be done in the future, when the earth shall be as densely populated over its whole extent as it is now in Holland.

"Here was a lake fifteen miles long, and seven broad in its greatest width. What fine farms we might have here,' said an enterprising Hollander, 'if this lake were only drained!'—'Yes; but it lies below the sea-level, and it would be impossible to drain it.'—'Then we must pump it dry.'—'Pump it dry! Who ever heard of such an absurdity?' But pump it dry they did. For this purpose, three large steam-engines were employed, each pumping a million tuns of water in twenty-five and a half hours. They commenced pumping in May, 1848; and laid it dry in July, 1852. Where the boats sailed and the fishes swam are now comfortable cottages, fertile fields, and a population of five thousand thriving citizens. In the same country it is now proposed to drain the Zuyder Zee, which covers two thousand square miles. The time will come when the land under Lake Erie will be of more value than the water within it; and, when that time comes, man will say to the waters, 'March!' and they will go, leaving the land for man's occupancy. Its greatest depth is but two hundred and seventy feet, and its drainage would be an easy matter. In like manner, the lands of Lakes Michigan and Superior will be needed, demanded, and obtained, and the sea be made to give up a large portion of its shallow shores to supply man's constantly-increasing demand for room."

The remarks of the author upon the climatic changes that have occurred within the historic period, and the remains of man in connection with those of extinct animals, are interesting and instructive. Although we cannot endorse all the inferences and opinions contained in the book, we believe it to be a meritorious contribution to popular scientific literature.

INTERESTING BORING AND MINING EXPERIMENTS.

A large number of gentlemen interested in mining and quarrying recently assembled at the lime quarries at Wrexham, Wales, to witness some interesting experiments with Haupt's improved Rock Drill. This machine was originally an American invention, but during the last year it has been much improved and rendered more practical and effective. The machine in its present form, is very compact, weighing only 150 lbs. It is operated by one man. All the working parts are made of hardened steel, in order to bear the severe work which it is designed to perform. It has a simple frame, with four adjustable legs, weighing about 90 lbs. The entire machine and frame can be easily moved by two men. The machine gives the same motions which are given to the hand drill, and is self-adjusting to all differences in hardness of rocks. The motive power in the experiments above alluded to, was steam, for which compressed air may be substituted upon occasion. The machine is capable of making from 400 to 500 strokes per minute, the force of the stroke being estimated at 200 lbs. It requires a force of two-horse power to drive it. The machine was operated upon this occasion by means of steam brought through a flexible tube from a locomotive in the quarry. The rock drilled was a seam of the hardest limestone. The first experiment was with a one and five-eighth inch drill, with a jet of water flowing into the bore to carry off the dust and keep it cool. The machine was put to its full speed, and in somewhat less than two and a half minutes, the tool penetrated sixteen inches. A drill of one and three-eighth inches was then set to work in the same hole, when an average rate of five inches per minute was attained. A hole thirty-two inches in depth was thus drilled in less than ten minutes, including stoppages. Subsequent experiments showed that this machine was equally adapted to horizontal, vertical, or angular drilling, and that irregularities of surface did not interfere with its adjustment.

These experiments were followed by some experiments with dynamite. Our readers are aware that nitro glycerin is formed by the action of nitric acid upon glycerin. Dynamite is nitro glycerin absorbed by silicious earth and in appearance resembles very closely coarse, brown sugar. Its properties are merely those of nitro glycerin, modified by the silicious substance, so that the dangers which attend the use of the former, are entirely obviated, while the strength of the explosion, when brought about by proper agents is augmented.

To show its harmlessness when stored or transported, a quantity of it was placed loosely upon a stone and set on fire by a match; when it slowly burned away, no explosion taking place. A similar quantity being placed in a like position and being fired by means of a fuse having the end placed in the dynamite terminating in a percussion cap, caused an explosion louder than a thirty-two pounder. This experiment was intended to show that without the charge of fulminate of mercury contained in the cap, or its equivalent, an explosion could not be produced. Next, the holes drilled as above, were charged with dynamite, some being tamped with sand, and others with water. The explosions in each case disengaged large masses of rock. The amount thus broken up was estimated as being six times as great as would have been the case with the same weight of gunpowder. One charge of one and a half pounds was placed in a horizontal hole nine feet in length, and, though the tamping was not well done, it was estimated that at least 1,000 tons of rock were detached by the explosion. These experiments, and many others which are constantly taking place, establish the great utility of dynamite beyond a doubt, and we believe the day is not far distant when it will supersede all other explosive agents for blasting.

INTERESTING TO RAILROAD TRAVELERS.—Judge Sharswood, of the Supreme Court of Pennsylvania, has decided that the platform of a railway company, at its station or stopping place, is in no sense a public highway, and that there is no dedication to public use Persons are allowed to walk over it for other purposes than as passengers arriving and departing in the trains, but they have no legal right to do so, and the servants of the company, after requesting them to leave, can remove them by whatever force may be necessary.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING AUGUST 25, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat.....$10
On filing each application for a Patent, except for a design.....$15
On issuing each original Patent.....$20
On appeal to Commissioner of Patents.....$20
On application for Reissue.....$30
On application for Extension of Patent.....$50
On granting the Extension.....$50
On filing a Disclaimer.....$10
On filing application for Design (three and a half years).....$10
On filing application for Design (seven years).....$15
On filing application for Design (fourteen years).....$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

81,320.—STEAM SAFETY VALVE.—E. G. Allen, Boston, Mass.

I claim, 1st, The combination of a spring, g, sleeve, d, and stem, c, substantially as and for the purpose specified.

2d, Constructing the let-off pipe with the perforations, s s s, as and for the purpose described.

3d, So arranging a whistle with reference to the safety valve that, at the first escape of the steam from said valve, the whistle will be sounded, and will continue to sound so long as the steam continues to escape, substantially as shown and described.

81,321.—LAMP BURNER.—John Allen, New York city. Antedated Aug 12 1 67.

I claim the adjustable draft or air regulator, A, arranged, constructed, and operated on the center-extension screw, B, substantially as described and for the purpose set forth.

81,322.—RAILROAD-CAR HEATER.—Ira R. Amsden, Buffalo, N. Y

I claim, 1st, Constructing a furnace car with a furnace or furnaces, C C, and surrounding chamber, K, provided with transverse or intermediate partitions, a a, having suitable apertures for the passage of air, substantially as shown and for the purpose described.

2d, The combination of the furnace or furnaces, C, space, K, and partitions, a a, constructed substantially as described, with a receiving chamber, J, and fan blower, I, the whole constituting the furnace car, as herein set forth.

3d, As a whole, the construction of furnaces, C C, surrounding chamber, K,

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alternating partitions, a a, receiving chamber, J, fan, I, driven from the axle or car wheels, and conducting pipes, G F, with flexible connections, H, for distributing the heated air, the whole arranged as described and operating in the manner and for the purpose specified.

81,323.—CAR COUPLING.—T. Arndt, Mt. Joy, Pa., assignor to himself, C. H. Nissley, and I. L. Landis.

I claim the combination of the pin supporter, E, link holder, C, pin, E, and link, M, all arranged and constructed substantially as described and for the purpose specified.

81,324.—LAMP BRACKET.—Wm. Ascough, Buffalo, N. Y.

I claim securing lamps in brackets by means of an upper guarding, C, and connections, d, for attaching to the supporting ring, substantially in the manner and for the purpose set forth.

81,325.—ELEVATOR.—E H. Ashcroft and J. R. Brown, Boston, Mass., assignors to E H. Ashcroft.

We claim, 1st, The shafts, I, having a series of screws or bosses, R, arranged therein, substantially as and for the purpose described.

2d, In combination with the shafts, I, having the bosses, R, secured thereon, the plates, J, having the semicircular grooves with screw threads cut therein, said parts being arranged for joint operation, substantially as described.

3d, An elevator, consisting of a cage or platform, having the screw plates, J, and the guide rollers, a, attached, and the shafts, I, with the bosses, R, mounted in a suitable frame, and arranged to operate substantially as herein described.

81,326.—STEAM SAFETY VALVE.—John Ashcroft, New York city.

I claim, 1st, The construction of the valve, M, and its seat, F, with guides, m, and openings, I, as herein set forth.

2d, The arrangement of the dome, A, case, B, and valve seat, F, as herein set forth.

81,327.—WAGON SPRING.—Calvin Atherton, Wales, Mich.

I claim the arrangement of the semi-elliptic springs A and C, in connection with the jacks, B and D, and the running gear of any wagon or carriage, substantially as herein set forth.

81,328.—SEWING MACHINE.—Robert Barclay, Buffalo, N. Y.

I claim the cam, P, and lever, R, in combination with the spring arms, S and V, constructed and arranged to operate as and for the purposes set forth.

81,329.—MECHANICAL MOVEMENT.—John S. Barden, Providence, R. I.

I claim the combination of an external and an internal gear with an eccentric, substantially as set forth.

81,330.—STEAM GENERATOR.—Charles Bean, East Douglass, Mass.

I claim the construction and combination of the section, formed of the tubes, A B, and the flues, D, with the apertures, C, substantially as herein shown and described.

81,331.—BELT FASTENER.—G. M. Beardsley, Fenton, Mich.

Antedated Aug. 7, 1868.

I claim the adjustable plates, B, turning pin, C, staple key, E, to be fastened to belt, A, all combined and arranged substantially as described and for the purpose set forth.

81,332.—SAWING MACHINE.—Peter S. Beidler, South Easton, Pa.

I claim, 1st, The combination, with the adjustable carriage, D, of the adjustable feeding apparatus, consisting of the trip catch, h, pendant bar, g, weighted lever, f, slotted bar, e, connecting rod, c, rock shaft, d, feed shaft and pinion, I, and swinging frame, K, arranged as described for the purpose specified.

2d, The combination, with the feeding shaft and pinion, I, arranged upon the swinging frame, of the means for changing the feed, when arranged substantially as and for the purpose described.

81,333.—SOIL PULVERIZER.—C. Berninger (assignor to himself, Wm. Friend, and G. L. Bailey), Mier Ill.

I claim the harrow teeth, d, and toothed cylinder, F, provided with the wheels G G, when said parts are applied or attached to a frame, E, suspended to a mounted frame, A, and all arranged substantially in the manner as and for the purpose set forth.

81,334.—EXCAVATOR.—Hiram Brown, Lowell, Mass.

I claim the scoops, A B, with the lips, n, in combination with the arms, G, and yoke, E, when used in connection with the movable carriage, with bangers, S, and wheel, P, ratchet, S, and pawl, o, all constructed and arranged substantially as described and for the purpose specified.

81,335.—PLANE.—Geo. Buckel, Detroit, Mich.

I claim a plane stock constructed of the parts, A and C, pivoted together, and provided with a spring, E, and set screw, F, substantially as and for the purpose set forth.

81,336.—HARNESS SADDLE.—George H. Buckius (assignor to himself, Cornelius Aultman, A. C. Tonner, and P. S Sowers), Canton, Ohio.

I claim the crupper piece, I, constructed as herein described, when used in combination with the tree, A, and water hook, C, substantially as and for the purpose specified.

81,337.—FARM GATE.—A. L. Butler, Ripon, Wis.

I claim, 1st, Making this gate into two sections, substantially as described and the manner in which it folds.

2d, The bar or lever, J, extending from the gate to either one of the standards of the framework, this lever being pivoted at each end.

3d, The whole of the device, comprising levers, bell cranks, latch gear, and pinion, substantially as described and for the purposes specified.

81,338.—TOOL FOR TURNING MOLDINGS.—W. W. Carey (assignor to himself and G. W. Harris), Lowell, Mass.

I claim the adjustable cutter block, e, when arranged as described and for the purposes fully set forth.

81,339.—SELF-CEMENTING BAND FOR HOLDING BANK NOTES, PAPERS, ETC.—E. M. Carrington, New York city.

I claim the band herein described, as a new article of manufacture, having a body of paper, with the ends made adhesive by rubber cement, so as to serve in the manner and for the purposes herein set forth.

81,340.—CHURN-DASHER.—John S. Carson, Brookhaven, Miss.

I claim, 1st A churn dasher, when composed of the plates, A and C, and these plates constitute four wings, as herein described, when these wings are constructed and relatively placed with respect to each other, and are held together, and on the spindle of the churn, by the collar, B, substantially as herein described, for the purpose set forth.

2d, The above-described dasher, in combination with the hinged cross table, F, when the latter supports the shaft, L, and its appliances, as herein described, for the purpose set forth.

81,341.—CHURN.—John S. Carson, Brookhaven, Miss.

I claim, 1st, The sectional helix dasher, A B, when the same is composed of the sections or parts, 1 2 3 4, constructed and relatively arranged as described, for the purpose set forth.

2d, The sectional helix dasher, A B, when constructed as described, in combination with the pulley, C, the driving wheel, E, the band or cord, F, and the crank, H, the whole being arranged for conjoint operation, substantially as shown and described, for the purpose set forth.

81,342.—LET-OFF MECHANISM FOR LOOM.—Benjamin F. Carter, Manville, R. I.

I claim, 1st, The combination of the cam block, a, on the wheel, B, with the lever, C, spring actuated rod, D, escapement lever, Y, wheel, n, and whip roll, b, substantially as and for the purpose described.

2d, The combination of the whip roll, b, lever, C, rod, D, springs, X and j, escapement lever, Y, and wheel, n, substantially as and for the purpose described.

3d, In combination with the above, the slide, g, formed with a socket for the reception of the head of the set screw, K, substantially as and for the purpose specified.

81,343.—SNOW CLEARER.—Richard Dover Chatterton, Bath, England.

I claim the combination of the wheel, C, shield, D, and spring scrapers, E, arranged and operating substantially as described.

81,344.—SHUTTLE FOR LOOM.—Augustus D. Clark, Wilkinsonville, Mass.

I claim, 1st, The combination and arrangement of the pin, h, plate, f, and bent spring, q, constructed substantially as herein described

2d, The bent spring, q, formed as shown, for the purpose of actuating both the spindle head and the pin, h, substantially as herein specified.

81,345.—MILK CAN.—Alonzo P. Cook (assignor to himself and Sylvanus B. Cook), Collins Center, N. Y.

I claim, 1st, The removable bottom, C, having a flange, c', in combination with the packing ring, d, follower, E, adjustable cross bar, F, and set screw, H, all parts being constructed, arranged, and operating substantially as herein described.

2d, Making the sides of a metallic receptacle for milk or other fluid beveled or flaring near its lower end, in combination with the removable bottom, C, substantially as herein described.

81,346.—TREADLE ATTACHMENT FOR SEWING-MACHINE.—John Crandell, Chicopee, Mass., assignor to Lamb Knitting Machine Manufacturing Company. Antedated August 7, 1868.

I claim a treadle attachment, consisting of the piece, B, and cap, A, hinged thereto, spring, d, the socket formed in A and B, and the ball, m, formed upon the connecting rod, , or upon the crank, G, the whole arranged and operating substantially as described.

81,347.—LOOM.—George Crompton, Worcester, Mass.

I claim, in combination with the upright hooked jacks, the angular lifter, depresser, or evener lever or levers, connected to the actuating slide rod by means of the gear rack fixed to the slide rod, and the segment gear on the lever, substantially as described.

81,348.—ATTACHING GUN-BARRELS TO STOCKS.—Nathan R Davis, Freetown, Mass.

I claim the combination and arrangement of the tongue and clamp screw with the tenon socket of the stock or its lock case, such being to operate with the tenon or tenons of the barrel or barrels, as specified.

Also, the combination of the inclined plane with the tongue and the clamp screw, arranged with respect to and combined with the socket for receiving the tenon or tenons of the barrel or barrels, as described.

81,349.—AUTOMATIC FLY BRUSH.—B. F. Day, East Freedom, Pa.

I claim the rods, b, carrying brushes, d when pivoted at one end eccentrically to the wheel, a, which are adapted to be rotated automatically, said rods working in guides, g, all substantially as herein shown and described, whereby both horizontal and vertical reciprocating motion is imparted to the brush carriers, as set forth.

81,350.—BRICK WALL.—John M. Deitz, Berne, N. Y., assignor to himself, C. T. Bush, and Sanford & Sisson.

I claim, in the construction of walls composed of brick and concrete, the combination and arrangement of the bricks, B B and H H, concrete, C, stanchions, P P P', braces, b b b, cleats, W W, and s, and guide board, D, substantially as and for the purposes herein set forth.

81,351.—BOILER FLUE CLEANER.—George R. Dobbins, Lowell, Mass.

I claim the arrangement of the spreader, c, flue end, e, pipe, a, flange, b, and rb, e, when constructed as herein set forth.

81,352.—MILKING STOOL.—Otis Earl, Hermon, N. Y.

I claim the combination, with a milking stool, of a tail-clamping attachment, arranged to be actuated by the weight of the milker, substantially as and for the purpose described.

81,353.—FANNING MACHINE.—George F. Evans (assignor to himself and George P. Riley), Chelsea, Mass.

I claim the fan, D, operating as described, in combination with arm, h, connecting rod, e, pinion wheel, I, crank pin, t, large wheel, K, pinion, S, barrel wheel, m, spring, d, fan wheel, W, thumb-screw, b, and crank, a, for winding, all arranged and operating relatively to each other, substantially as described, and for the purpose set forth

81,354.—WATCH CHAIN HOOK.—Charles Faas, North Attleboro, Mass.

I claim, 1st, The eye, A, in combination with the swiveling hook, a, the sliding band b, and the springs, b' b', as and for the purpose set forth.

2d, The divided link, c, in combination with the band, b, substantially as described.

81,355.—THILL COUPLING.—Reuben Fink, and Jacob B. Hershock, Lancaster, Pa.

We claim, 1st, The combination of the hinged pieces, A B, arranged and entering the slotted prolongation of the bed plate, substantially in the manner and for the purpose specified.

2d, In combination with the piece, A, hinged at a, to the notched piece, B, the bed plate, C, when prolonged and furnished with a slot, H, and coiled springs, D arranged and operating substantially in the manner and for the purpose described.

81,356.—SAWING MACHINE.—John Frey, Osnaburg, and John M. Eichholtz, Canton, Ohio.

We claim the driving shaft, S T, composed of the tube, S, with journal, s, and shaft, t T T', with collar, t', when used in combination with the driving pulley, P, of a sawing machine, said pulley being maintained in its relative position to the machine by means of arms, Y Y, the extended ends of which form the boxes of the driving pulley, P, substantially as and for the purpose specified.

81,357.—MACHINE FOR DRAWING AND SPINNING COTTON.—Jim B. Fuller, Norwich, Conn., assignor to himself, James P. Upham, and Edwin T. Rice.

I claim, 1st, The bearing, d, or its equivalent, constructed as described, so that by turning it in different positions the roller, D, may be adjusted to the length of cotton being drawn, substantially as and for the purpose specified.

2d, The saddle, the back part of which is cut out, as described, so that in moving the back top roller forward or back, the position of the saddle stirrup and weight or spring is not altered, substantially as and for the purpose set forth.

3d, In a drawing or spinning frame, where two top rollers rest on only one bottom roller and where the silver is drawn partially around the said bottom roller, the middle top roller, C', constructed and operated as shown and described, in combination with the roller D and C, and bearing, d, substantially as and for the purpose specified.

4th, The rollers, C C' D, and the bearing, d, combined and arranged substantially as and for the purpose set forth.

5th, The rollers, B' C and D, in combination with the saddle, a, substantially as and for the purpose herein specified.

81,358.—EXPANDING BOTTOM FOR BEDS, SEATS, ETC.—Eli K. Garretson, Ottawa, Ill.

I claim the construction of a cot, bed, or seat, with a flexible bar, D, in combination with legs, A B, stretchers, C C, supports, e e, bolts G G, and friction rollers, i i, the bottom of the cot being of canvas or other suitable materials, and secured by means of cords, fastened to the edges with rocs, h h, and stretchers, C C, substantially in the manner and for the purposes described.

81,359.—LAMP WICK.—Wilhelm August Gensch, New York city.

I claim the lamp wick composed of animal and vegetable fiber, and steeped in the composition composed of the ingredients herein set forth in the manner and for the purpose specified.

81,360.—BASE-BURNING STOVE.—Isaac H. Gildersleeve, Whitewater, Wis.

I claim, 1st, A stove, consisting of base A, outer shell, B, inner shell, C, pot, K, magazine, L, grate, M, and pipes, N N, substantially as described.

d, Grate, M, when made with air spaces for air to pass through, for the purpose of consuming the gases from the coal, and to keep the grate from burning out, substantially as described.

3d, Grate M, with a serrated rim, substantially as described.

81,361.—MACHINE FOR CUTTING PANELS.—F. D. Green, (assignor to himself and George Zimmer & Co.), Williamsport, Pa.

I claim the tooth or cutter B C, constructed and operating substantially as herein shown and described, in connection with the cutter head, A, as and for the purpose set forth.

81,362.—HEATER RANGE.—William A Greene, Troy, N. Y.

I claim, 1st The removable contracting or dividing plate, H, lined with fire brick or soapstone, and combined with the boiler-hole top plate, C, fire-box, G, and exit flues, J E J E, therefrom, all in manner substantially as shown, and fully described hereinbefore, for the purposes specified.

2d, The combination of the fire-box, G, boiler hole top plate, C, the dumping fire grate, Y, the contracting plate, H, and the stationary fire-grate, X, which forms a fixed support for the foot or bottom part of said plate, H, all in manner substantially as shown, and described herein, for the purposes specified.

3d, In combination with a boiler hole, q, of top plate, C, the curve, c, in the upper part of a removable contracting plate, constructed so as to fit or correspond with the said boiler hole, substantially as set forth herein.

4th, The relative arrangement of the deflecting plates, i I, in the boiler-hole flues, u u, when employed in combination with the removable contracting plate, H, with its curved recess, c, boiler-hole top plate, C, fire-box, G, and flues, J J, in manner substantially as herein set forth.

5th, The deflecting cover plate, L, when constructed with closed sides and open ends, and inclined so that there may be a greater current towards the front, and combined with the direct flue, F, and oven plate, M, substantially as herein shown and described.

81,363.—COUPLING FOR VEHICLES.—Charles W. Greter, Three Rivers, Mich.

I claim, 1st, A coupling device for vehicles, constructed and arranged, substantially as described and for the purposes set forth.

2d, The curved plate, m, with notch, l, braces, j j, with curved slot, E, thereon, and cross plate, l, with nib, g substantially as described, when constituting the prominent features of a vehicle coupling, all as set forth.

81,364.—MACHINE FOR BLOCKING HATS.—William C. Griswold, Brooklyn, N. Y., Augustus Pelisse, Newark, N. J., and Albert H. Hook, New York city.

We claim, 1st, An expansible block, in combination with the brim plates, b and b', constructed, arranged, and operating substantially as herein specified.

2d, The combination of the band ring, r, holding plates, b b', and expansible block, substantially as and for the purposes herein specified.

81,365.—MACHINE FOR BENDING WOOD.—John S. Hall, Jeffersonville, Ind.

I claim the flexible strap, provided with sockets, C and D, in combination with the mold or former, P, constructed and arranged to operate as set forth.

81,366.—ATTACHING SOLES TO BOOTS AND SHOES.—Francis H. Hawks, St Louis, Mo.

I claim the new application and use of screws, together with washers or eyelets, as herein described, for the purpose of attaching water proof half soles and heel taps to boots and shoes.

81,367.—WIRE STRETCHER FOR FENCE.—William B. Hayden Columbus, Ohio.

I claim, 1st, A hooked ratchet bar, C, constructed with teeth, h l, and a book, c, in combination with a hooked sliding pawl, said parts being adapted to operate substantially in the manner and for the purposes described.

2d, A hooked ratchet bar, C, and a hooked sliding pawl adapted for receiving a lever, G, for effecting the tightening and loosening of wire in fences and vine frames, substantially as described.

81,368.—GATE FOR WATER WHEEL.—James L. Helmer, Rome, N. Y.

I claim the movable part, C, of the guide, in combination with the arms, C2 and C3.

81,369.—FEATHER RENOVATOR.—Charles E. Hendrick, Chicopee, Mass.

I claim the annular chambers, P P, in combination with the valves, O O m n, and conveyer, F, provided with branches, j j, drier, E, and feather box, B, when constructed, arranged, and operated substantially in the manner shown and described, for the purpose set forth.

81,370.—LAMP.—Joseph E. Hendricks, Waterbury, Conn., assignor to Brown & Brothers.

I claim the sustaining and clasping springs, f, adapted to support the base of the chimney below the base of the burner, in combination with the internal spring holder, formed on the rim of the base, the whole arranged to operate substantially as shown and described for the purposes set forth.

81,371.—COMBINED POTATO PLANTER AND CULTIVATOR.—Charles F. Hoffman, New Orleans, La.

I claim, 1st, The eccentric, T, when provided with the wire fingers or cups, d, and otherwise constructed, as described, in combination with the box, U, and the feeding trough, V, when these several parts are arranged and operated substantially as described for the purpose set forth.

2d, The cutting box, M, when provided with a knife, N, that is constructed and operates substantially as described for the purpose set forth.

3d, The eccentric, T, in combination with the trough, V, the cutting box, M, and the knife, N, when these several parts are constructed and arranged with respect to each other, and operate substantially as herein described for the purpose set forth.

4th, The eccentric, T, the cutting box, M, and the knife, N, in combination with the plows, G G''' G''G', and the planting "shoes," R, when these several parts are constructed, arranged, and conjointly operate substantially in the manner and for the purpose herein set forth.

81,372.—CHURN DASHER AND LID.—Samuel P. Hopkins, Port Deposit, Md.

I claim, 1st, The star dasher, constructed and arranged substantially in the manner as herein described, for the purpose specified.

2d, The double lid or covers, D E for dasher churns, when constructed in the manner herein described.

3d, The combination of the star dasher and double cover, as and for the purposes set forth.

81,373.—MACHINE FOR MITERING.—Frank A. Howard, Belfast, Me.

I claim, 1st, The movable V-shaped cutters, E, affixed to plates, G, in combination with the notched rest plate, I, operated in the manner described, for the purpose specified.

2d, The cutters, E E, affixed to plates, G G, which are hinged together at H, and provided with rods, n, passing through arched slots, m, in the vertically adjustable holder, U, whereby the said cutters are adjusted to the desired angle and there retained, substantially as described, for the purpose specified.

3d, Adjusting the plate, I, and the cutters, E E, simultaneously, by means of the screw shaft, Q f, nuts, e l, shaft, M, bevel gearing, N O L W, substantially as herein described, for the purpose specified.

4th, A V-shaped cutter, E E, when arranged to approach the wood to be mitred with a horizontal movement, and also provided with a vertical movement, substantially as shown and described, and for the purpose set forth.

81,374.—BALE FASTENING.—William M. Irvine, Montgomery, Ala.

I claim reinforcing one end of the plate, and confining the ends of the strap or band, in the manner herein set forth and shown.

81,375.—CORN SHELLER.—George F. Johnson, Marshall, Iowa.

I claim, 1st, The radially expanding shellers, provided with the curved plates, e e and e1 e1, in combination with the wheel, C, and spring, D, substantially as and for the purpose described.

2d, The arrangement, with relation to the drawing rollers, E E, and shelling wheel, C, having the toothed rim, C1, of the drive shaft, S, main wheel, F, pinion, G, and connecting gearing as herein shown and described, upon the frame, A B S1, for the purpose specified.

81,376.—GUIDE FOR SCROLL SAW.—L. A. Johnson, New York city.

I claim the grooved guide-roller, D, fitted in the pressure clamp, A, to receive the saw, E, substantially in the manner as and for the purpose set forth.

81,377.—SAD IRON HEATER.—S. M. Johnson, Lockport, N.Y.

I claim, 1st, The valve, l m, arranged with the burner, F, and hollow rod, G, substantially in the manner and for the purpose set forth.

2d, The burner, F consisting of the tube, x, provided with slots, s s, and radiating wire, o, in combination with the vaporizing chamber, e, arranged as and for the purpose specified.

3d, The radial corrugations, u u, arranged with the burner, F, substantially as shown and described.

81,378.—BUTTON BOOT.—Joseph L. Joyce, New Haven, Ct.

I claim cutting or dividing the flap at or near the ankle-joint line, substantially in the manner and for the purpose herein set forth.

81,279.—TREADLE FOR SEWING MACHINE.—Carl Kihn, New York city.

I claim the sewing machine treadle, composed of a plate, A, of roughened glass, supported in and elevated above the frame, B, carrying a standard D, or its equivalent, and the open clutches, C, the whole being constructed, applied, and operating substantially in the manner and for the purpose set forth.

81,380.—DIE FOR MAKING CLEVIS BLANKS.—Jacob Kritch, Cleveland Ohio.

I claim the dies as herein described for the purpose set forth.

81,381.—JOINERS' CLAMP.—Jacob Kuneman, Canton, Ohio.

I claim the joiners' clamp, composed of a clamp lever, A, with pawl, a ratchet bar, B, with ratchet teeth, b, and clamping head block, F, and bar C D, with holes, c c, connecting bolts, k k, and clamping head block, E, when said ratchet bar, B, is pivoted to the lever, A, between the bar, C D, and the ratchet, a, and the whole clamp is so arranged as to fold up in the form shown substantially as and for the purpose herein specified.

81,382.—WAGON BRAKE.—F. D. Ladenberger, Glenbeulah, Wis.

I claim, 1st, The combination, in a wagon brake, of the cross bar, A, loose sway bar, B, connected by any suitable rods, i i, and kept back to the extent of their play by a spring, e, of any suitable form or arrangement, with brake shoes, j j, suspended by stirrups or links, k k, connected with the axle tree by rods h h, all arranged to operate as brakes by being connected with the double tree, m, by the plates, a and b, all substantially as shown and described.

2d, The combination in a wagon brake of the concave iron, l, on the sway bar, B, with the friction roller, n, the slotted plate, B, slotted tongue, and doubletree bolt, all arranged to take the draft strain proportionately when the sway bar and cross bar are drawn forward to the extent of their forward movement, all substantially as herein shown and described.

81,383.—BRIDGE GUARD OR BARRIER.—John Lehmann, Crown Point, Ind.

I claim the combination of cog segment, A, ratchets, B B, pinions, C C, racks, D D, pawl, L, and catch levers, P P', all arranged and operating substantially as herein set forth, for the purpose of operating a bridge barrier.

81,384.—DEVICE FOR LOCKING LOOSE PULLEYS.—Wm. J. Linton, Detroit, Mich.

I claim the improved locking device herein described, consisting of the sleeve, sliding pin, stationary pin, spring, and stud, all arranged substantially as set forth.

81,385.—DERRICK.—Chas. S. Lockwood, Newburg, N. Y.

I claim the counter-weight to balance the bucket on a derrick, in the way as shown and described and for the purpose as specified.

81,386.—FILTER.—Wm. C. Long and Harvey A. Lownsbery, Lockport, N. Y.

We claim the arrangement, in connection with the galvanized iron filter, A, of the diaphragms, a a, dividing the packing chamber, and the ribs, g g, strengthening the water chamber, the whole operating in the manner and for the purpose specified.

81,387.—PERAMBULATOR.—Charles Lyne, Padstow, England.

I claim the arrangement of the axle, A, cross piece, C P, bolt, b, plate, P, rod, R, guides, G and G', and springs, S and S', in the manner and for the purpose herein set forth and described.

81,388.—STEELYARD.—H. Maranville, Akron, Ohio.

I claim the loop or head, C, spring, b, as arranged, in combination with the yokes, G D, and beam, A, for the purpose and in the manner set forth.

81,389.—FIREPLACE.—G. H. McElevey, Newcastle, Pa.

I claim, 1st, The described arrangement of the air heating chambers G H I, and their connecting flues, the supply flue, P, the fire and smoke flue, J, and the exposed grate, E, as herein described, for the purpose specified.

2d, The arrangement of the slide damper, m, and damper, K, with relation to the air-heating flues, G H and I, whereby the products of combustion are either directed to the flue, J, between the chamber, G, and fire grate, or over the chamber, G, between the same and the chamber, H, or over the chamber, I, or over the chamber, G, and downward around the chamber, I, as herein described, for the purpose specified.

81,390.—BAIL EAR FOR PAILS.—Wm. J. McLea, Leroy, N.Y., assignor to himself and Frank Ladd.

I claim attaching bail ears to pails and other vessels by means of the tips, d d', in the manner set forth.

81,391.—COUPLING BELT.—Thomas McMullin (assignor to himself and Miles Mendenhall), Osgood, Ind.

I claim the combination of the eccentric rollers, a, furnished with V-shaped grooves, b, with the plates, A A' and prongs, c, when arranged and operating as and for the purpose set forth.

82,392.—RAILROAD CAR HEATER.—W. S. McNeil and O. S. Cadwell, Jr., Springfield, Mass.

We claim, 1st, The described arrangement of the case, H, fire box, A combustion chamber, D, hot air chambers, E J, fire opening, B, pipes, K L m, perforated pipe, F, screen, d, water chamber, z, air purifying chamber, X, and air supply tube and double funnel, W P, as herein described, for the purpose specified.

2d, The hot-air pipe, L n, and the cap, o, in combination with the perforated pipe, F, and hot-air chambers, J E, as herein described, for the purpose specified.

3d, The arrangement of the air purifying chamber, X, lined with absorbent material, and containing the curved deflectors, with relation to the water chamber, z, air supply pipe, W, and hot-air chamber, E, whereby the motion of the car splashes the water through the perforated bottom of the air chamber, and saturates the absorbent material for the collection of dust and cinders, as herein shown and described.

81,393.—MECHANICAL MOVEMENT.—Daniel S. Merritt, Mount Morris, Mich.

I claim the combination and arrangement of the four levers, D, the pitmen C and H, and the levers, J, when attached to any suitable frame, A, and constructed and operating substantially as and for the purposes set forth.

81,394.—TRACE BUCKLE.—Charles H. Miller, Buffalo, N. Y.

I claim the binged pressure cam, F, constructed and operating as specified.

81,395.—BRIDLE BIT.—Charles H. Miller, Buffalo, N. Y.

I claim the bar or mouth piece, A, and slotted lever guides, B, when constructed, and the latter cast disrended, to permit the insertion of the bar, A and tongue, m, in the manner described.

81,396.—HOSE NOZZLE.—John B. Mitchell (assignor to himself and Perez B. Burnham), Portland, Me

I claim, 1st, A hose nozzle having the adjustable tube, B, ring, A, arms, b, and ring, 1, arranged to operate as and for the purposes described.

2d, In combination with the above, the belt, d, as and for the purposes set forth.

81,397.—CAR COUPLING.—Leonard Monzert, New York city.

I claim the pivoted ring, C, arranged with relation to the jaws, B B, provided with concentric depressions, d, all operating as set forth, whereby the ring is swung back over the depressions, to permit the opening of the jaws, and swung forward to securely lock and hold them in place, as herein described and shown.

81,398.—SURPLUS HONEY BOX IN BEE-HIVE.—Hiram Moon and Dewitt C. Turner, Red Creek, N. Y. Antedated August 21, 1868.

We claim 1st The adjustable honey-case, C, when constructed as and for the purpose set forth.

2d The case, C, in combination with adjustable box, B, and hive, A, when constructed substantially as described.

81,399.—KNIFE AND FORK HANDLE.—Charles A. Moore, Westbrook, Conn.

I claim the making of knife and fork handles in sections or pieces, substantially as herein specified, and for the objects set forth.

81,400.—SAWING MACHINE.—M. P. Noel, St. Cloud, Minn.

I claim, 1st, The oscillating log-holding frame F, when pivoted to the oscillating saw guide frame, E, controlled by the lever, h, and hook, h' whereby the holding dogs, g, clamp the log upon each side of the saw holding frame, and saw guide frame, all constructed, arranged, and operating as herein shown and described.

2d, The log frame, B, operated in the transverse guides, a, by the lever, C, only, whereby the log is set to the saw by one movement of the lever, as herein set forth.

81,401.—CONFECTION.—Dudley L Page, Lowell, Mass.

I claim a new and improved combination maple chocolate cream, as herein described, using for that purpose the aforesaid ingredients or composition of matter, as a new article of confection, substantially as and for the purpose described.

81,402.—PIPE CUTTER.—John Peace, Camden, N. J.

I claim the improved pipe cutter herein described, consisting of the threaded handle, C, tubular holder, B, having the female screw therein, knife g, cylinders, A and D, and set screw, F, all constructed, arranged and operating as described.

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81,403.—TRACE FASTENER.—Thaddeus Peck, Stratford, Ct.

The key, C, whose shank is formed with projections c2, when adapted to be fitted into recesses formed in the ends of the whiffle-tree, and prevented from turning therein by means of the staple, D, passed transversely through said recess, and resting in notches formed in the sides of the shank, c1, all as herein shown and described, for the purpose specified.

81,404.—APPARATUS FOR FEEDING SCREW BLANKS.—Elijah S. Pierce, Hartford, Conn.

I claim the combination of the roller, C, and belt, D, with the hopper and trough, A B, when constructed and arranged substantially as herein described.

81,405.—BRICK MOLD SAFETY GUARD.—Benjamin Porter (assignor to himself, John George, Thomas E. Lusk, Alfred E. Vandercook, and Oscar Vandercook), Jackson, Mich.

I claim the springs, D, when provided with hinge joints, H, and braces, E, which latter move in the recesses, G, of doors, C, all operating and arranged substantially as described and for the purposes set forth.

81,406.—BRIDGE—Andrew J. Post, Hudson City, N. J.

I claim in combination with a wrought iron strut, the employment of end pieces of cast iron, fitted into and between the parts of the wrought iron, and receiving a through-bolt through both the wrought and cast-iron parts, all substantially in the manner and for the purposes herein set forth.

81,407.—MORTISING MACHINE.—John Richards, Cincinnati, Ohio.

I claim, 1st, The right and left threaded screw, m, and fixed and movable nuts, k and l, when used to operate the chisel bar of a mortising-machine, as herein set forth and described.

2d, The shaft, p, and bevel gears, n' and n, when used in combination with the ram or carrier, a, and as a means of rotating the reverse threaded screw, m, substantially as specified and shown.

3d, The shaft, p, and bevel gears, n' and n, for rotating the screw, m, as specified and shown.

4th, The belt, q, and pulley, r, when used in combination with the ram or carrier, a, and as a means of operating the reverse threaded screw, m, for feeding the chisel bar down, substantially as set forth and shown.

5th, The friction clutch, consisting of the plate, o, pulley, r, in combination with the reverse threaded screw, m, and carrier, a, for producing a graduated feed of the chisel bar, h, for the purposes and in the manner shown.

6th, The weight, u, and belt, t, when arranged to operate as a graduated resistance to the rotation of the screw, m, as a means of returning the chisel bar to its up stroke, arranged and operating as herein described.

7th, The screw, W, when formed with a compound or right and left hand thread, and used as a means of adjusting the table bracket, M, arranged and operating as set forth and specified.

81,408.—LIQUID METER.—Charles H. Riggs, Warwick, N. Y.

Antedated August 17, 1868.

I claim, 1st, An automatic liquid meter, having its receiving pipe, C, opened and closed by the buoyancy and weight of a float, I, the said float being controlled in its action by the floats, G and H, and the whole in combination with the siphon, F, all substantially as shown and described, and for the purpose set forth.

2d, The receiving cistern, D, substantially as shown and described, in combination with the meter tank, B, floats, I G and H, the siphons, E and F, as and for the purpose set forth.

3d, The springs, m and l, or other equivalent device, substantially as shown and described, in combination with the float, I, pins, e and n, and levers, k, and g, all as and for the purpose set forth.

4th, The levers, q and b, operated by the float, I, substantially as shown and described, in combination with the gate, d, pipe, C, and tank, B, and siphon, E, all arranged as shown and described, and for the purpose set forth.

5th, The ratchet, f, and pawl, u, substantially as shown and described or the equivalent thereof, for the purpose of operating the registering dial, J, of a meter, when in combination with the float, I, rod, l, meter tank, B, and floats, G and H, all as set forth.

6th, The reservoir, M, substantially as shown and described, in combination with the siphon, F, floats, I G and H, and meter tank, B, as and for the purpose set forth.

81,409.—HORSE RAKE.—A. H. Robins, Copenhagen, N. Y.

I claim the bars, O O, attached to the handle shafts, M M, and provided with oblong slots, g, through which screws, h, pass into the shafts, K K, for the purpose of admitting of the proper operation of the stop, e, as set forth.

2d, The connecting or suspending of the rake to the cart or sulky by means of the rods, Q Q, arms, R R, shaft, S, and lever, T, all arranged substantially in the manner as and for the purpose set forth.

81,410.—PLASTER SOWER.—Henry Rodes, Clarence Center, N. Y.

I claim the arrangement, in connection with the intermediate brush, G, of the hitter, E, provided with the spiral loops e', situated above, and the raised edges, n n, of the discharge openings situated below said brush, the whole operating in the manner and for the purpose specified.

Also the hinged arm, D, with holding band, p, and elevating toggle, r, and serving, with gear b, to give motion to the parts in the hopper, as set forth.

81,411.—CAR BRAKE.—Franklin Root, Boston, Mass.

I claim, 1st, The arrangement of the lever brakes, B and C, pins, m and n, and sheaves, E, substantially as and for the purpose specified.

2d, The combination of the sliding inclined plane, D, with lever brakes, B and C, clasping sheaves upon an axle, when constructed substantially as described and for the purpose specified.

3d, The lever clutch brakes, C and B, with removable shoes, when each shoe clasps one-half the circumference of a sheave, in combination with sheaves having V-shaped grooves into which the shoes fit, when constructed substantially as and for the purpose specified.

81,412.—SUNSHADE FOR HORSES.—Sarah Ruth, Philadelphia, Pa.

I claim the canopy, A, and the supporting frames, B and C, the said parts being constructed, applied, and operated substantially as and for the purpose set forth and described.

81,413.—SAW.—David Sattler, Mifflin, Ohio.

I claim the peculiar arrangement and combination of the knife teeth, D F, planing teeth, B B, gage tooth, C, and clearing tooth, E, on the saw blade, A, when the several parts are constructed and arranged substantially as and for the purpose herein specified.

81,414.—CAR BRAKE.—S. W. Y. Schimonsky, Cheyenne, Dakota Territory.

I claim the brake shoes, G, rigidly attached to the frame, D, sliding through the wheels, E, upon the guides, F, and attached to the lever, I, all operating as described, whereby the shoes G are alternately wedged upon each side of the wheel, between the same and the guide, F, as the lever is operated in either direction, as herein shown and described.

81,415.—HAND STAMP.—A. Selkirk (assignor to J. Gibson, Jr.), Albany, N. Y.

I claim, 1st, The loaded plunger, B, with its slot, e, set screw, d, the dovetail or T-shaped terminus of the plunger, B, in combination with the type blocks, h h, with their recesses, s s, or their equivalents, substantially for the purpose set forth and described.

2d, The socket, b, or its equivalent, and the handle, c, in combination with the outer cylinder, A, for the purposes set forth and described.

3d, In combination, the cylinder, A, with its printing type end, the loaded plunger, B, as described, the elastic spring, f, the perforating type, h h, handle socket, b, or its equivalent, and the handle, c, all in combination, substantially for the purpose set forth.

81,416.—HORSE COLLAR FASTENING.—W. A. Sharp and J. A. Shannon, Tama City, Iowa.

We claim the described construction of the metallic sockets, d d, secured to the ends, B C, of the collar, and provided respectively with the longitudinally beveled recess, c, and tenon, t, arranged as described for the purpose specified.

81,417.—PUMP.—J. Shaw, Bridgeport, Conn.

I claim the two lifting pumps, Cx Cxx, fitted within the external case, A, provided with a valve, C, at its bottom, and all constructed and arranged to operate in the manner substantially as and for the purpose herein set forth.

81,418.—SAWING MACHINE.—Pius Lee Shepler, Whitehouse, Ohio.

I claim, 1st, The combination of the drums, M", shaft, G", spool, I", chain, J", and carriage, K", all arranged to operate as herein described and shown.

2d, The rest, Z, when provided with a slot, B", and operated by means of the curved and bent lever, C", all as and for the purpose described and shown.

81,419.—DIE FOR MAKING SQUARE-HEADED BOLTS.—Wm. Shields, Philadelphia, Pa.

I claim the narrow ledge, e, at the bottom of the die, in combination with the side walls thereof and the plunger, as and for the purpose herein described.

81,420.—DEVICE FOR SOLDERING CANS.—M. M. Shur, Delaware, Ohio.

I claim, 1st, The arms, B, having slots, i, and pivoted within the slots, d, and the pins, a, fixed to the slots, b, all constructed, arranged, and operating as and for the purpose set forth.

2d, In combination with the staves, A, and arms, B, bearing pins, l, the cage slats, k, as and for the purpose described.

3d, In combination with the parts, D C G, the collar, H, when provided with inclined surfaces, m and the loose handle, E, having pins, h, all constructed and operating as and for the purpose specified.

81,421.—MEAT CUTTER.—F. G. Siemers, Winona, Minn.

I claim, 1st, The meat-cutting machine, consisting of the frame, A B, with the tables C D, the reciprocating frame h, with the series of knives attached thereto, and the rotating chopping block, K, operated by the shaft, G, the rock shaft, q, and pawls, t and w, all constructed and arranged to operate substantially as herein described.

2d, The chopping block, K, consisting of a series of pieces set endwise and bound together with a band, o, and set screws, p, and provided with the removable curb, M, constructed and arranged as herein described.

3d, The arrangement of the tables, C D, in combination with the meat-cutting apparatus, when constructed as herein set forth.

81,422.—SPRING-BED BOTTOM.—P. Sisson, Brant, N. Y.

I claim supporting the slat, A, on the ends of the inclined spring levers, B B when arranged substantially in the manner and for the purpose set forth.

81,423.—HARVESTER.—Amos Smith, Vienna Cross Roads, O.

I claim the arrangement of the bars, K L, at the junction of which the cutter bar is pivoted, upon the outer end of the axle of the machine and the bearing of the pitman shaft respectively, when said bars are adjustable as described, and the bar, K, provided with the pivot, i, of the lever, O, and the slotted standard, P, for raising the outer end of the cutter bar, all constructed, arranged, and operating substantially as set forth.

81,424.—LIFTING JACK.—Charles A. Smith, New York city.

I claim the combination of the lever, H, ratchet wheel, D, cogged wheel, E slide, B, ratch bar, C, with safety wheel, F, and brake or safety band, i, all constructed as described, and operating substantially as and for the purposes herein set forth.

81,425.—PLANE.—F. Smith and I. Carpenter, Lancaster, Pa.

We claim, 1st, The adjustable cap, provided with the guard in front of the set screw, e, substantially as and for the purpose described.

2d, The set screws, a2, in the lugs, a1, arranged to clamp upon the adjustable wedge, C, as herein shown and described for the purpose specified.

81,426.—HOP VINE TRELLIS.—Youngs W. Smith, Bristol, N. Y.

I claim the improved hop trellis, formed of the elevated parallel supporting wires, a a, and standards, A A, in combination with stakes, B B, and diagonal net work of twine, alternating from row to row, and stake to stake, over the intermediate supporting wires, a a', arranged substantially as set forth.

81,427.—BREAD CUTTER.—J. D. Soles, Lynn township, Ill.

I claim the combination of the arched standard, A, its guide plate, B, and flange, i, and bed plate, m, the gage E, the guide, F, the spring, S, the lever and knife, C and D, all as and for the purposes described.

81,428.—SMUT MACHINE.—Henry Stanley, St. Johnsbury, Vt.

I claim the grain cleaning machine, composed of one or a series of perforated scroll cases, surrounding one or more taps, the spouts, E G, and the fan, I arranged substantially as and for the purpose described.

81,429.—FAN FOR SEWING MACHINES.—James H. Stone, Washington, D. C.

I claim operating the rotary fan to a sewing machine directly from the driving shaft A, through the medium of the beveled gearing, B F, as described for the purpose specified.

81,430.—PERMUTATION LOCK.—T. J. Sullivan, Albany, N. Y.

I claim the tumblers, constructed as described, of the perforated annular plate, a, grooved disk, G, and divided annular spring, b, having the pin, i, all arranged and operated as described for the purpose specified.

81,431.—SPRING FOR VEHICLES.—Charles D. Sutton, Tarrytown, N. Y.

I claim an improved platform spring formed by the combination of the cross springs, C, constructed substantially as described, and forming a flat support for the fifth wheel, with the side springs, B, and shackles, D, as and for the purpose set forth.

81,432.—MACHINE FOR TURNING LOGS IN SAW MILLS.—Esau Tarrant, Muskegon, Mich.

I claim, 1st, The toothed bar, C, pivoted at its lower end between the blocks E, which are adapted to slide in vertical grooves formed in the posts D, whereby the said bar, C, is rendered vertically movable and capable of adjustment to suit logs of different sizes, substantially as herein set forth and shown.

2d, The combination with, and arrangement with relation to, the bar, C, of the cord or chain, F, pulley, G, shaft, J, drum, I, friction pulleys, K L, and adjustable shaft, M, all as set forth and shown.

3d, The arrangement of the pivoted brake, R, connection, S, and pivoted bridge tree, O (in which is formed the outer bearing for shaft, M), substantially as herein shown and described, whereby the pulley, L, is removed from contact with pulley, K, and the brake brought into contact with the latter, and *vice versa*, simultaneously, as herein set forth.

4th, The arrangement of the cam and shaft, P Q, and weighted arm, T, with relation to the connected brake and bridge tree, to operate as and for the purpose described.

81,433.—STEAM GENERATOR.—Ed. Taylor, Tecumseh, Mich.

I claim the arrangement of the suspended counterbalanced boiler, B, within the fire box or chamber, A, and the elevated tank or reservoir, I, substantially as and for the purpose set forth.

81,434.—BELT SAW.—George Thompson, Nashua, N. H.

I claim the arrangement, substantially as herein shown and described of the pulleys, d, each adjustable independently of the others, with relation to the pulley, A, and saw, a, as set forth.

81,435.—SHINGLE BOLT MACHINE.—Thomas Thompson, Buffalo, N. Y.

I claim, 1st, The arrangement of the rack bars, H, pinions, G', friction wheels, I and J4, and shifting rod and lever, K K', with the counterbalanced swinging frame, C, as a means of raising and lowering the same, as set forth.

2d, The step lever, M', and pivot arm, M, in combination with the stationary table, F, provided with a slit in one side for the passage of the saw, arranged and operating in the manner, for the purpose described.

81,436.—FIRE ESCAPE.—T. Thompson, Jr., New York city.

I claim the ladder, D, constructed substantially as herein shown and described, that is to say, with two side bars at each side, to which the flanged ends of the broad steps are pivoted, in combination with the balcony, B, permanently attached to the outer wall of the building, in the manner and for the purpose set forth.

81,437.—BURIAL CASE.—Franz Vester, Newark, N. J.

I claim the application of the tube, C, and ladder, H, to a burial case or coffin, substantially as and for the purposes described and set forth.

Also, in combination with the tube, C, and ladder H, the cord, K, and bell I, for the purposes substantially as set forth and described.

81,438.—LOOM FOR CIRCULAR WEAVING.—Adolph Wagner, (assignor to Samuel Beinstein), New York city

I claim, 1st, A circular weaving machine, in which the core or block, H, is vertically as well as horizontally adjustable, substantially as described, so that tubular, as well as irregular shaped fabric may be produced, as set forth.

2d, The device herein shown and described, for imparting reciprocating motion, in opposite directions, to the two sets of carriers, E or E', which compose a group, said device consisting of the pin, p, cam on the drum, B, and pinion, m, in combination with the toothed carrier stems, substantially as and for the purpose herein shown and described.

3d, The carriers, E' E', when arranged in combination with the upright bars, I I, and sliding block, o o, the bars, I I, being divided in the middle, as set forth, to allow the passage of the woof threads, as specified.

4th, The carriers, E E, when provided with diverging horizontal arms, substantially as set forth, for the purpose of distributing the warp threads, and of allowing the grouping of the carriers between the pinions, e e, as herein described.

5th, The carriers, E or D', when arranged and operating as described, the shuttles, L L, when made as described, and the up and down as well as horizontally adjustable block, H, all in combination with each other and with the rotary drum, B, and all made and operating substantially as herein shown and described.

6th, The sliding pins, p, in combination with the carrier stems, substantially as and for the purpose shown and described.

81,439.—CURB FOR WATER WHEEL.—P. H. Wait, Sandy Hill, N. Y.

I claim, 1st, The portion, F, of the curb, constructed as described, of the top and bottom plates, g g', the latter provided with a pendent flange, h, forming a portion of the case, A, the side and end bars, i j, adapted to receive the gate, D, and door, G, all arranged as described, for the purpose specified.

2d, The curved gate, D, constructed as described, with a flange, f, adapted to work against the vertical central bar, d, in the frame, E, said frame being provided with the ledges, c c, out of line with each other, as herein described, for the purpose specified.

81,440.—QUILTING FRAME.—Daniel F. Wallace, Ripley, Ohio.

I claim a quilting frame, constructed with rests, D D, movable posts, a a a a, roller, A B, braces, E E, and nuts, b b b b, as combined and arranged for the use and purpose as specified and herein set forth.

81,441.—VESSEL FOR HOLDING PETROLEUM AND OTHER LIQUIDS.—Elisha Waters, Troy, N. Y.

I claim a closed cylindrical tank-like or barrel-shaped vessel, formed essentially or mainly from paper pulp, paper in sheets, or paper or straw board, of any suitable quality, and supported internally by disks or hoops at the ends, or an extended wooden shell, substantially as described herein.

Also, a closed cylindrical tank-like or barrel shaped vessel, formed essentially or mainly from paper pulp, paper in sheets, or paper or straw board, with or without internal end hoops, or an inner wooden shell, substantially as described, in combination with an exterior protecting case formed of wooden staves and heading, and fitted or secured to the paper vessel, substantially as set forth, so that the paper vessel shall not turn within the wooden case, and yet shall be free or separable therefrom along the joints of the staves.

81,442.—SAW SET.—W. B. Weaver, Reading Centre, N. Y.

I claim the combination of the leather packing, l, and adjustable plate, E, with the jaws, A, as herein described, for the purpose specified.

81,443.—MECHANISM FOR OPERATING PILE WIRES IN LOOMS.—William Weild, Manchester, England (assignor to Elias S. Higgins), New York city.

I claim, 1st, Wire motions, where the head of the wire only is guided during its insertion and withdrawal, and the point is supported and transferred from the point of withdrawal to the point of insertion by a trough or bar, d, oscillating on a fulcrum or joint, substantially as hereinbefore described.

2d, The combination of wires, with heads of the shape shown in figs. 4 and 4a, with an oscillating grooved trough, d, substantially as hereinbefore described.

3d, The spring pieces, d3, or their equivalents, in combination with the oscillating grooved trough, d, substantially in the manner described.

4th, The slide, b, provided with a projection, b3 for pushing directly against the head of the wire, when combined with an oscillating trough, substantially as hereinbefore described.

5th, The combination and arrangement of the mechanism of the wire motion shown by figs. 1, 2, 3, 4, and 4a, and hereinbefore described.

81,444.—RAILROAD GATE.—David S. Weise, Brecknock township assignor to himself, Jacob H. Bingaman, and Joseph W. Goshert, Durloch, Pa.

I claim the combined arrangement of my notched rocker, T, adjoining the rail, pivoted bars, L, rocker shaft, B, and lever, t; also the crank arm, c, connecting rod, D, stirrup bracket, E, and gate, F G H, all arranged and operated substantially in the manner and for the purpose specified.

81,445.—CHURN.—C. N. White (assignor to himself, W. S. Harris, and T. P. Roland), Batesville, Miss.

I claim, 1st, The combination of the dasher plates, E, block, F, plate, G, and cover, H, with each other, and with the churn body, D, said parts being constructed and arranged substantially as herein shown and described and for the purpose set forth.

2d, In combination with the above, and with the frame, A B C, the fixed centre, j, and crank screw, L, all arranged and operating substantially as and for the purpose set forth.

81,446.—COUGH MIXTURE.—Samuel R. Whitlow, Rosefield, Ill.

I claim the compound cough mixture, prepared and compounded, and to be used substantially as described.

81,447.—BAIL MAKING MACHINE.—Henry C. Wilder, Ashby, Mass. Antedated August 13, 1868.

I claim, 1st, The spring supports, B R, so arranged with formers, V V', and vibrating arms, X X', or their equivalents, as to receive the pressure of the wire at the ends of the bail wood, while being bent, as described, and for the purpose specified.

2d, The vibrating shaft, J, the lever, g, and the hardened steel die, F, with the guide thereto, combined and operating as described, and for the purpose set forth.

3d, The opening tunnel, H, so arranged with other necessary parts as to guide the bail wire through the bail wood, in combination with the stationary slotted tunnel, S, constructed substantially as described, and for the purpose set forth.

4th, The arrangement and combination of the bent lever, B, with the pivot, v, the spring, x, the spring top, C, the incline, t, the adjustable gage, s, and the set screw, b, constructed and operating substantially as described, and for the purpose set forth.

5th, The arrangement and combination of the spur gears, P P', the washer and screw, n n', the connections, A A, the catch, r, the spring, W, and the ratchet wheel, Q, constructed and operating substantially as and for the purpose set forth.

6th, The arrangement and combination of the shaft, D D, the gears, m n, the pins, j j, or their equivalent, with the lever, g, and vibrating shaft, J, operating substantially as and for the purpose set forth.

7th, The arrangement and combination of the lever, g, the spring, p, the arms, c1, the spring, h, the shaft, J, and the spring, W, operating substantially as and for the purpose set forth.

8th, The arrangement and combination of the adjustable cutter plate, D, the hardened steel ring, G, the hardened steel cutter, d, the lever, C C, the pin, E, and the spring, K, operating substantially as and for the purpose set forth.

9th, The arrangement and combination of the crank, z, the grooved rolls, O O O', the pivoted lever, r, Z, or its equivalent, and the adjusting screw, L, operating substantially as and for the purpose set forth.

10th, The plate having thereon the guide, y, and the incline, s, in combination with the vibrating shaft, J, having the steel die, F, thereon, operating as and for the purpose set forth.

11th, The construction, combination, and arrangement of all the parts, substantially as described, and for the purpose specified.

81,448.—GRAIN SEPARATOR.—Miles D. Williams, Lawton, Mich.

I claim, 1st, The upper screens, L, provided with the jaws, M, in connection with the shoe, B, screen case, A, bolt, C', and nut, D, operating in the manner described and for the purposes specified.

2d, The combination of the above-named parts with the grain separator, constructed and arranged substantially as and for the purpose set forth.

81,449.—LUBRICATING HUBS AND AXLES.—Thomas Wilson, Garton, England.

I claim, 1st, The cam nut, v, when arranged to operate substantially as described and set forth.

2d, The oil receptacle, j, in combination with the conductors, n n, substantially as and for the purpose described.

3d, The pistons, l l, with their valves, m m, when operated upon by a cam nut, v, substantially as herein described and set forth.

4th, The sand guard, g, and waste box, t, in combination with the box, c, and bearing p, when arranged substantially as described and set forth.

5th, The arrangement and combination of the oil receiver, j, pistons, l l, with their valves, m m, conductors, n n, box, c, with its nuts, d and e, bearing, p, with spiral groove, q, waste box, t, sand guard, g, shell f and f', and hub, a, all when arranged substantially as described and for the purposes fully set forth.

81,450.—WATCHMAKER'S DRILL.—Alois Wirsching (assignor to himself and Albert Wild), Brooklyn, N. Y.

I claim the drill shaft, B, fitted within the tube, A, in connection with the spring, E, arranged or applied as shown, or in an equivalent way, and the string, F, attached to a drum or pulley on the drill shaft, all constructed to operate in the manner substantially as and for the purpose set forth.

81,451.—PUMP PISTON.—John Wood, Franklin, Pa.

I claim the movable sections, A B C, the packing, P, the ball valve, V, and rings, e, arranged as herein described, for the purpose specified.

81,452.—FIFTH WHEEL FOR CARRIAGES.—Edmund Yeiser, Sheriden, Pa.

I claim the perch plate, B, as constructed, in combination with pin, g, guides, C C, axle, D, bar, A', and supports, H H, arranged substantially as set forth.

81,453.—LET-OFF MECHANISM FOR LOOMS.—Charles H. Young, River Point, R. I.

I claim the combination of the wheel, D, with the escapement, J, arranged so that the projections, e e, on the arms shall move clear of the projections, r r, on the wheel, D, when any extra strain is thrown upon the warp, substantially as herein described and for the purpose set forth.

81,454.—CASTER FOR SEWING MACHINE.—Levi O. Allen, Gardiner, Me.

I claim the combination of the pivoted legs, A A, with slots, c and c, in combination with the link, F, slotted clutch, G, and lever, D, substantially in the manner as herein shown and for the purpose specified.

81,455.—GOVERNOR FOR STEAM ENGINE.—Thomas Alsop, Elkhart, Ill.

I claim, 1st, The arrangement of the independent rod, J, resting upon the rod or stem, b, and having its upper end held against rod, I, by means of a lever, L, or its equivalent, whereby the ingress of steam is controlled or arrested, substantially as herein set forth.

2d, The combination of the parts, C C', clutch, m n', and rods I and J, substantially as described.

3d, The weighted lever, L, or its equivalent, in combination with the valve stem, b, and steam governor apparatus, in such a way that, when the motion of the bell shaft is retarded, as compared with that of the governor balls, the weight will be dropped, and the cut-off valve thereby closed, substantially as described.

81,456.—MODE OF ATTACHING SPRINGS TO MILL SPINDLES.—Thomas Alsop, Elkhart City, Ill.

I claim the combination of the case, E, pinion, D, shaft, A, and spring, m, with its outer end attached to the case, E, and the inner end attached to the spindle by by the sleeve, e, arranged substantially as described, and for the purpose specified.

81,457.—BOOTS AND SHOES.—Robert Andrews, Milwaukee, Wis, Antedated August 7, 1868.

I claim the method of making boots and shoes water proof, by putting the hair side or grained surfaces of two pieces of leather together, and putting between them some lubricating material, to prevent abrasion and injury from attrition, as herein described, using, for the purpose of lubrication, any material composed by me, or any oily substance which will produce the intended effect, and using any and all kinds of leather which may be used to make boots and shoes made of any and all kinds of skins.

81,458.—CORN SHELLER.—Daniel Bacon, Brewersville, Ind.

I claim the lever, f, plunger, d, teeth, o b, springs, a a, an platform, A, constructed and operated substantially as shown and described, for the purposes set forth.

81,459.—BUTTER TUB.—A. R. Bailey, Elmore, Vt.

I claim in comoination with a butter tub having the usual cover, and provided with angular grooves, b b, on the inner side, near the top, the additional interior cover, B, having journals, a a, for fitting into the grooves, b b, as and for the purposes specified.

81,460.—WASH BOILER.—Alex. R. Ball and Wm. M. Phelps, Marshall, Mich.

We claim, 1st, The inclined false bottom, B, in combination with a wash boiler, substantially as and for the purpose specified.

2d, Providing said inclined false bottom, B, with side flanges, C, or other equivalent means for reversing its incline, when employed in combination with a wash boiler, substantially in the manner and for the use set forth.

81,461.—ENGRAVERS' PLATE.—Thos. Bardon, Brooklyn, N. Y.

I claim an engraving surface formed of type metal, or its equivalent, fused upon the surface of a harder metallic plate, such as brass or steel, for the purposes and substantially as set forth.

81,462.—STEAM MACHINE FOR EXTRACTING STUMPS.—Alfred B. Beaumont, Austerlitz, Mich.

I claim, 1st, The combination and arrangement with the derrick, A A, mounted upon wheels, B B, of the steam engine, D E g, with stack, l, and the reservoir, z, the whole being in portable form, whereby the machine may be moved over a stump, and the steam applied for extracting it, as herein set forth.

2d, The combination and arrangement of the connecting rods, I I, jointed arms, J J, pawls, h h, with the ratchet wheel, i, whereby the forward turning of the ratchet is produced at both strokes, in the manner and for the purpose specified.

3d, The combination with the pawls, h h, of the cam plate, y, having cams, j j, rods, K K, and lever, L, for throwing said pawls out of gear, as herein set forth.

4th, The arrangement of the wire ropes, s s, passing through the slots, t t, and retained by a rod passing through the loops, as set forth.

5th, The arrangement of the brake, Q, connecting cord or rod, R, and lever S, with the brake wheel, B, as herein described.

6th, The combination and arrangement with the wheels, B B, of the swing or sustaining bars, C C, and the rope or chains, c c, pulleys, a b, and holding devices, z z, as herein set forth.

7th, The arrangement as a whole, consisting of the derrick, A, steam engine, D E g, connecting rods, I I, arms, J J, with pawls, h, ratch wheel, i, roller, N, with wire cords or chains, s s s, and adjusting wheels, B B, all as herein set forth.

81,463.—BOOT TREE AND STRETCHER.—Jacob Bechtel, Roxbury, Pa.

I claim, 1st, A boot tree when made in two parts, one of which is provided with blocks and rollers worked by a screw, for the purpose of pressing them outward, substantially as and for the purposes herein set forth.

2d, The last, C, constructed as described, in two parts, adjusted by screws, and provided with a tongue fitting into a slot on the lower end of the front part of the boot tree, substantially as and for the purposes herein set forth.

81,464.—TOOL FOR CUTTING HOLES IN CLOTH OR LEATHER FOR BUCKLE TONGUES.—Alma Bedford, Coldwater, Mich.

I claim a tool for cutting holes in leather or cloth, to receive buckle tongues, consisting of the cutting tool, J, and locking device, G, constructed and arranged to operate substantially as herein described.

81,465.—ROTARY PUNCH.—Alma Bedford, Coldwater, Mich.

I claim a rotary punch, having attached to its upper jaw, E, by means of a set screw, B, an adjustable plate, A, rotating parallel with it, provided with a series of punches C, and having its lower jaw, F, provided with a removable wooden or other bed, D, all constructed and arranged substantially as herein described.

81,466.—GUIDE FOR SEWING MACHINE.—Charles Benedict, and O. R. Fyler, Woolottville, Conn.

We claim the gage, constructed with a curved groove and flanged face, substantially as herein described.

81,467.—LEVER JACK.—Jacob Bernheisel, Sr., Green Park, Pa.

I claim the coiled spring, H, the slide, K, and the curved oval slot, D, in which the pivot, G, of the lever, C, works, when arranged, constructed, and operating as herein described, and for the purpose set forth.

81,468.—RAILWAY STOCK CAR.—George R. Blanchard, Baltimore, Md.

I claim, 1st, A car, for the transportation of animals and other kinds of freight upon railroads, convertible from a double to a single deck or platform car, and *vice versa*, by means of a swinging or dropping deck or platform attached to the sides of said car, substantially as shown and described.

2d, The removable section, D2, which occupies the central position between the sections, A1 A A1 A2, substantially as shown and described.

3d, The arrangement of devices, substantially such as are shown and described, for receiving and carrying the central portion of the deck when not in position for use.

4th, The arrangement of the beams, and their rests or supports, with refer-

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ence to the platforms or sections of the upper deck, and the framework of the car, substantially as shown and described.

81,469.—HAME.—Thomas G. Brooks, Oneida, Ill.

I claim the hame, A, when provided with a notched plate, b, in combination with the slotted spring, D, constructed as described, for the purpose of attaching the hames together by means of the ring, B, substantially as and for the purposes herein set forth.

81,470.—WINDLASS.—N. B. Brown, Antwerp, N. Y. Antedated August 17, 1868.

I claim, 1st, The brake, j, in combination with a ratchet wheel, E, and clutch, g, the several parts being constructed and operated substantially as and for the purpose specified.

2d, The arrangement of the shaft, R, wheel, E, and crank, F, with the clutch, G, pawl, K, and brake, j, when the various parts are constructed and operated as and for the purpose herein fully set forth.

81,471.—SKEIN HOLDER.—Thomas F. Brown, Jr., Concord, N. H.

I claim the combination of the plates, A B, slitted and notched, as described, with their connections and operative spring, arranged and applied to them substantially as specified, the whole being for the purpose as explained.

81,472.—HARVESTER.—Thomas S. Brown, Poughkeepsie, N. Y.

I claim, 1st, The shipping lever, provided with a cam or eccentric slot and notch, to receive the pin on the sliding fork, when constructed and operating substantially as set forth.

2d, The combination of the slotted and notched lever with the spiral spring and the sliding fork, when constructed and operating substantially as set forth.

3d, The combination of the slotted and notched lever with the spiral spring, the sliding fork, and the wheel having a grooved and ratcheted hub, when constructed and operating substantially as set forth.

81,473.—HARVESTER RAKE.—Thomas S. Brown, Poughkeepsie, N. Y.

I claim, 1st, A swinging gear frame or box mounted upon and vibrating horizontally about the vertical rake and reel shaft, substantially as described.

2d, The horizontal driving shaft mounted in a swinging gear frame, whose axis of vibration is the vertical rake shaft.

3d, The combination of a swinging gear frame with its gearing and a double jointed tumbling shaft, by the use of which the usual extensible tumbling shaft is dispensed with, substantially as described.

4th, The vertically adjustable switch lever for the purpose described.

5th, The adjustable switch lever, in combination with an adjustable hook or spur on the revolving rake arm or rake head, for actuating said switch lever, as described.

6th, A movable switch lever, in combination with means for removing said lever out of the way of the actuating hooks or spurs on the rake arms or rake head.

7th, Operating the switch lever by means of a spring or equivalent device, and a hand or foot lever within reach of the driver on his seat on the machine, so that said switch lever may be made to engage the hooks or spurs on the rake arms or not, at pleasure.

8th, The combination of the switch lever, spring, or weighted lever, and foot or hand lever, substantially as described.

9th, Attaching the adjustable hook or stop to the iron roller cheek or elbow, so that an adjustment of the angle of the rake arm relative thereto will not disturb the relation of said hook to the switch lever.

10th, The arrangement of the pulley, R, over which the cord for actuating the switch lever passes, in the same or nearly the same plane with the joints which connect the platform with the machine.

11th, Giving to the switch lever an inclination backward from its shaft, substantially as described, so that in case of a backward movement of the rake arms, the hooks or stops thereon will press said lever downward, and pass over it without injury thereto.

12th, The foot lever, provided with the stops or shoulders and spring, operating substantially as and for the purpose described.

81,474.—CURB FOR WATER WHEEL.—James B. Dryson and John H. Hartsuff, Newcastle, Pa.

We claim the curved plates, F F, loosely attached to the ends of the gates, E E, and sliding on the chutes, B B, all operating substantially as and for the purposes herein set forth.

81,475.—MACHINE FOR SAWING LATH.—William G. Bulgin, Vienna, N. J.

I claim the arrangement of the two sets of bevel gear, k m and b n, placed centrally in the machine, to be operated by the hand lever G, for reversing the motion of the log carriage, and moving it forward and back, alternately, at a different rate of speed, substantially as and for the purposes herein set forth.

81,476.—CUTTING PRINTERS' LEADS.—John W. H. Cheney, Hartford, Conn

I claim the arrangement of the hand cutter, F, and the parts by which it is operated, with the stationary cutter, a, bed, C, and adjustable gages, D and E, when constructed as described and for the purpose specified.

81,477.—TRUNK LID SUPPORTER.—Philip Cohen, Chicago, Ill.

I claim, 1st, Stud, B, spring, F, hook arm, G, all operating substantially as described and set forth.

2d, Quadrant bar, A, provided with perforations, 2, when operating in connection with case, D, substantially as set forth and shown.

81,478.—CONSTRUCTION OF CARTRIDGE SHELLS.—James F. Cranston, Springfield, Mass., assignor to "The American Trading Company."

I claim forming the flange, p, on the inside of the shell by means of the dies, E and F, at the same operation in which the shell tapered, substantially as shown.

81,479.—SUPPORTER FOR STOCKINGS.—Elizabeth L. Daniels, Boston, Mass.

I claim the combination of a stocking and diaper supporter, in the manner and for the purposes herein described, when the same consists of the band, A, supports, D B and C, and buckles, e, substantially as and for the purpose set forth.

81,480.—CAST CUT.—George P. Darrow (assignor to James L. Haven and Company), Cincinnatti, Ohio.

I claim a cast screw nut, whose threads are interrupted at the parting seam, as set forth.

81,481.—BLACKING BRUSH.—Clark D. Day, Chatham, Conn.

I claim the combination of the smaller brush, a, fitting into the socket, b, with the scrap, c and set screw, d.

82,482.—SHOULDER BRACE AND SUSPENDER COMBINED.—Alice M. Eaton, Boston, Mass.

I claim the within described shoulder brace and suspender, consisting of the waistband, B, with its buckle, elastic straps, A and C', and those, e e and g g, with their buckles and button holes, the whole combined, arranged, and operating substantially as and for the purpose set forth.

81,483.—LOW WATER INDICATOR.—Theodor G. Eiswald and James Barbour, Providence, R. I., assignors to T. G. Eiswald.

We claim, 1st, The arrangement of the cup, E, fusible plug, P, tube or stem B, and openings or side pieces, e e, or their equivalents, when constructed to operate in the manner described.

2d, The arrangement of the above-described apparatus within the hollow globe, cylinder, or exploded pipe, A, substantially as shown and described.

81,484.—COAL STOVE.—John Fahrney, Boonsborough, Md.

I claim, 1st, An attachable and detachable rim, B, when used in connection with base burning or reservoir stoves, substantially as and for the purpose specified.

2d, The sliding plates, C C, when employed in combination with the rim, B, for the purpose described.

81,485.—MAGNETIC TELEGRAPH.—Moses G. Farmer, Salem, Mass.

I claim the arrangement and combination of the rheostat-receiving magnet, and two-point key, or their equivalents, suostantially as described.

81,486.—COMPOSITION FOR CURING CORNS, BUNIONS, ETC.—A. J. Ferguson, Sharon, Pa.

I claim the within described process of treating corns and bunions, consisting, first, in bathing the corn or bunion with muriatic acid, and then applying the compound, prepared as herein specified.

81,487.—LOOM FOR WEAVING PILE FABRIC.—Levi Ferguson, Lowell, Mass.

I claim, 1st, The combination of the steadying box, I, with the lever catch H, and the auxiliary carriage or wire transferrer, G, provided with mechanism for operating it, substantially as described.

Also, the combination of the steadying finger, L, (provided with mechanism for operating it as described), with the withdrawing carriage, E, its abutment, K, and the transferrer, G.

Also, the combination of the withdrawing carriage, E, the heel plate transferrer, G, the lever, M, and its notched plate, N, such being for supporting and transferring the wire, in manner as specified.

Also, the combination of the auxiliary arm w, and its cam, x, with the lever, M, the studs, s and d2, the carriage, E, and the transferrer, G, arranged to operate as specified.

Also, the combination of the tripping catch, O, its operative rail, P, and abutment, Q, with the lever, M, and its notched plate, N.

Also, the arrangement and combination of the cam or inclined plane, R, with the withdrawing carriage, E, the transferrer, G, and the lever latch, H, to operate as specified.

81,488.—VACUUM APPARATUS.—Theophilus Fravel, Westville, Ind.

I claim, 1st, The construction of the cape, H, and the manner of fastening, it to the door or cover of the apparatus, substantially as shown and described.

2d, The construction and arrangement of the pit, A, seat, D, door, G, with its aperture for the neck, and exhaust aperture, 1, all substantially as shown and described.

81,489.—DRAWING FIBROUS SUBSTANCES.—Jim B. Fuller, Norwich Conn., assignor to himself, James P. Upham, and E. T. Rice.

I claim the roller, C, the band, d', and drawing rollers, E F, adjusted and arranged substantially as described, and for the purpose specified.

81,490.—FUEL SIZE INDICATOR.—J. Gibson, Jr., Albany, N.Y.

I claim, 1st. The size representations, a a a, of fuel, facsimiles in form and size, or outline size representations, b b b, or measurement size representation, c, or any fuel size representations equivalent thereto, cast solid with or attached to any stove, heater, furnace, or the like, or cast with or attached to any part or appendage of such stove or heater, as and for the purpose set forth and described.

2d, The fuel size representations or indications, a, b, or c, or their equivalents, attached permanently to any stove or heater, or when made detachable, either with or without the words, d d, or their equivalents, as and for the purpose set forth and described.

3d, The words, d d, or their equivalents, in one or more languages, when used on any stove or heater, or on any appendage thereof, in connection with a fuel size representation, a, b, or c, or their equivalent fuel size representation, as and for the purpose set forth and described.

81,491.—AUTOMATIC TOY.—Wm. F. Goodwin, East New York, N. Y.

I claim, 1st, In the construction of the leg of a toy, adapted to imitate the movements of the natural leg, the attachment of the bar, B4, to the lower end of the bar, B1, and to the foot, at a point in advance of the point of attachment of bar, B3, to said foot, substantially as and for the purpose shown and described.

2d, The frame or hip plate, D, to which the legs are attached, and by means of which said legs are connected with the body of the toy, substantially as described.

3d, The construction of legs or movable parts of the toy, substantially as described, whereby, when the toy is moved over the floor, the said parts are caused to imitate the movements of the corresponding parts of the natural limb which it is designed to represent, substantially as set forth.

4th, The legs of a toy, made of one or more pieces, connected with cranks, or the equivalent thereof, and operated or made to walk by contact of the feet or lower extremities with the surface over which the toy is propelled or drawn.

81,492.—HOT AIR FURNACE.—C. B. Gregory, Beverly, N. J.

I claim, 1st, The arrangement of the fireplace, chamber, H, with its tubes, p, chamber, x', and the flue, E, as and for the purpose specified.

2d, Perforated plates, arranged above the sides of a fire pot, so that their lower edges may be raised from contact with the fire pot, for the purpose set forth.

81,493.—WINDOW SASH.—Henry Goss, Tiffin, Ohio.

I claim the tongue, C, spring, D, set screw, g, bar, h, and pins, j j, arranged in combination with the sash, B, to operate as set forth.

81,494.—WATER ELEVATOR.—Jos. Gruey, Kendallville, Ind.

I claim the water elevator described, consisting of curb, A, shifting shaft, B, with bar and pins, b4, loose spools, C C', with gear wheels, c1, and cylinder, c, having the face wheels, c2, standard, D, adjustable shaft, d, with gear wheel, d2, lever, E, clevis, H, and spring, h, with wheel, h1, the whole being combined, arranged, and operated in the manner and for the purposes set forth.

81,495.—PREPARING OILS.—Stuart Gwynn, New York city, assignor to S. M. Clark, Washington, D. C.

I claim oils prepared and purified in the manner which I have herein set forth.

81,496.—APPARATUS FOR THE PURIFICATION OF OILS.—Stuart Gwynn, New York city, and S. M. Clark (assignors to S. M. Clark), Washington, D. C.

We claim, 1st, The within described combination and arrangement, in successively lower planes, of an oxidizing tank, A, provided with a detachable stirring shaft, H, and diffusing sieve, P, a neutralizing tank, B, with sieve, P', at top, and steam or hot air pipes, Q, within the same, a steaming tank, C, containing suitable steam-jet pipes, R, and an evaporating tank or vessel, D, the whole being adapted and made to operate for the refinement of oils, as has been herein set forth.

2d, In combination with the tanks, A B C and D, of our apparatus, outer vertical glass indicating tubes, S, communicating with the bottoms of said tanks, and operating as herein described.

3d, The within described combination of inclined or cam surfaces and suitable notches, formed upon a revolving sieve, P, with pins supporting the same, when arranged and operating to lift and drop the sieve in its revolutions, substantially as herein set forth.

81,497.—BOX OPENER.—H. H. Hall, Tioga, Pa.

I claim the lever or stock, A, hooks, b and J, spring, e, and wedge, d, all combined, constructed, and arranged substantially in the manner and for the purpose set forth.

81,498.—PAN-FOLDING MACHING.—William Hamilton, Philadelphia, Pa.

I claim the hinged folding plate, with grooved edges, or its equivalent, the metal projections or their sides and ends, or their equivalent, and the application of the rollers and movable slides, as substantially set forth herein, by the combined action of which the operator is enabled to fold a pan or box at one motion, and of any required form or size.

Also, the prepared metallic sheet, E E, fig. 5, as described, and for the uses and purposes herein set forth.

81,499.—CAR SPRING.—G. W. Harris and George Elliott, Aurora, Ind.

We claim, 1st, A spring composed of one or more leaves which taper from mid length endward, and the upturned margins of which, likewise, taper endward.

2d, A spring, composed of a series of nested leaves, A B C, which, with their upturned margins, taper in width endward, and are secured by means of a central band or strap, substantially as set forth.

3d, The pack of flanged tapering and nested leaves, A B C, in combination with the stepped strap, E e 1 2' 2', bolt, F, and nut, G, substantially as and for the purpose set forth.

81,500.—CHUCK.—Benjamin Haviland, Hudson, N. Y.

I claim, 1st, The general construction and arrangement of the several parts, which, taken together, constitute the chuck herein described, whereby the same may serve as a screw-cutting die or a universal chuck, all as set forth.

2d, Rotating the cam plate, c c, and retaining it in position by means of the rack plate, detent, a, and stub, e, substantially in the manner specified.

81,501.—GATE.—H. A. Henderson, Avoca, N. Y.

I claim the adjustable pulley, b, running in the slot, c, and on the rail, E, in combination with the movable pulley, s, on the gate post, for the purpose of allowing the gate to be slid backward and forward as well when raised as when in its proper position, substantially as herein set forth and described.

81,502.—CORN PLANTER.—A. E. Herrington and J. D. Richards, Big Prairie Ronde, Mich.

We claim, 1st, The combination of the collars, M, on the axle, B, with the shields, P, provided with openings and slides, which latter are operated by levers, R S, all arranged and operating substantially as described and for the purposes set forth.

2d, The combination the lever, A, and arms F F', with the vibrating bars, G, and teeth, D', arranged to operate substantially as and for the purposes set forth.

3d, In combination with the above, the lever, T, hinged at U, and provided with standard, V, to operate the frame, C, suostantially as and for the purpose set forth.

81,503.—CRIMPING CLAMP.—Lucian Hill, West Brookfield, assignor to Lawson Hill, North Brookfield, Mass.

I claim, 1st, The combination, with the jaw part, C, spindle, A, and nut, a, of the spiral spring, substantially as and for the purposes set forth.

2d, The combination, with the jaw part, C, screw spindle, A, and hinged jaws, B B, of the spiral spring, I, and nut, a, substantially as and for the purposes set forth.

3d, The combination, with the jaw part, C, and nut, a, of the hinged jaws, B B, substantially as and for the purposes set forth.

81,504.—DEVICE FOR HOLDING SPOOLS OF THREAD.—L. F. Hobbs, Quincy, Mass.

I claim a spool holder formed of wire and provided with the axle, holder, b, thread guide, c, retaining pin, a, and socket or eye, d, the whole arranged and operating substantially as herein set forth.

81,505.—MACHINE FOR MAKING GINGER SNAPS, ETC.—D. M. Holmes, Williamsburgh, N. Y.

I claim, 1st, The combination of the follower, C, cross bar, E, and screws, F, with the dough box, A, frame, B, and driving shaft, I substantially as herein shown and described, and for the purpose set forth.

2d, The knife frame, S, adapted to slide in dovetail grooves formed in the bottom of the dough box, A, upon each side of the perforations, whereby the knives, R, are adapted to be fastened upon the under side of said frame, and work in contact with the perforations, as herein described for the purpose specified.

3d, Operating the sliding knife frame, S, from the shaft, M, by means of the cam wheel, T, and gear wheels, V and X, substantially as herein shown and described and for the purpose set forth.

4th, The combination and arrangemet of the gear wheels, L J N O K, and sliding clutch, Q, with each other and with the shafts, M and I, for the purpose of operating the follower, C, substantially as herein shown and described.

81,506.—BRICK MACHINE.—William H. Hovey, Springfield, Mass.

I claim, 1st, The rolls, A and B, of different diameters, and in combination with the scrapers, J J', and the vibrating table, having a reciprocating rectilinear motion, with or without the curved plate, C, when operating substantially as described.

2d, In combination with a table, having a reciprocating rectilinear motion, as described, a gate, L, for preventing the return of the molded brick into the machine, and for depositing the same upon the carrying board, b, substantially as specified.

3d, The combination and arrangement of the mold bed, P', and vibrating table, having a reciprocating rectilinear motion, rolls, A and B, scrapers, J and J', and plate, C, plungers, P, and tracks, l', and the gate, L, the whole arranged and operating substantially as described.

81,507.—MANUFACTURE OF WHIPS FROM INDIA-RUBBER.—Liverus Hull, Charlestown, Mass.

I claim the whip stock or body as composed not only of cloth covered with a vulcanizable composition, and rolled up as set forth, but of a retainer or retaining covering of thread, either braided or wound thereon, for the purpose of supporting the roll during the process of vulcanizing it by heat.

Also, a whip as composed of the stock or body so made, and one or more coverings of thread, or leather, or other suitable material or materials, either wound, braided, or otherwise properly fixed on such body.

81,508.—BITTERS.—A. T. Hyde, Rochester, Minn.

I claim the within described compound for medicinal bitters, as and for the purposes herein set forth.

81,509.—CHEESE PRESS.—Silas Y. Ives, Meriden, Conn.

I claim, 1st, The arrangement of the two platens, M and E, combined with the drums, G, and bands, L, so as to operate, by the descent of the platens, substantially as specified.

2d, In combination with the above, the drum, M, operating as described.

3d, In combination with the subject-matter of the first clause, the bands, S, and drum, T, arranged so as to operate substantially as specified.

81,510.—ABDOMINAL SUPPORTER.—A. F. Jennings, Sherman, N. Y.

I claim, 1st, The combination of the interposed elastic band, C, and the check strap, D, with the body belt, A, and pad, E, arranged and operating in manner and for the purposes herein set forth.

2d, The formation of the pad with the central elevation, c, raised rim, d, and intermediate annular depression, f, in the manner and for the purpose specified.

81,511.—BRICK MACHINE.—Philip H. Kells, Adrian, Mich.

I claim, 1st, The annular wrought iron rings, K K', in combination with the mold wheel, I, and followers, 12, substantially as and for the purpose described.

2d, The provision, in the bed plate, B, of the openings, b b, and wedge-shaped center-piece, b', substantially as and for the purpose specified.

3d, The adjustable columns, A' A', constructed and arranged as described, in combination with the bed plate, B, and pug mill, C, substantially as and for the purpose set forth.

81,512.—HORSE SHOE.—Albert E. Kroger, Norwalk, Conn.

I claim the arrangement and attachment of the hollow calks to the shoe, by means of the studs, D, and mortises, C, or their equivalent, in the manner substantially as and for the purpose described.

81,513.—FENCE.—Abraham Lapham, Farmington, Mich.

I claim the portable fence, consisting of the bars, B and D, pivoted together near their top, the bars, B provided with cross bars, A, the ends of which are beveled, and the bars, D, provided with the bars, E, similarly beveled, all constructed, arranged, and operating as herein described.

81,514.—WINDING FRAME FOR CARDING ENGINE.—William Leach, and Joseph Leach, New Harmony, Ind.

We claim the smooth rod or roller, A, provided with movable flanges, B B, in combination with a series of drums, D D, above, and another series of drums, C C, below the same, all constructed as described, and operating substantially as and for the purposes herein set forth.

81,515.—CHALK-HOLDER FOR BILLIARD TABLE.—Andrew M. Leonard and Belmont Perkins, Ann Arbor, Mich.

We claim the construction of a box, B, provided with a hinged bottom, C, and chain, L, in connection with circular box, D, lever, E, fulcrum screw, F, spring, G, and key, I, when arranged and operating substantially as and for the purposes herein set forth.

81,516.—SHOE.—James S. Lester, and Perrin H. Cardwell, Knoxville, Tenn.

We claim the front piece, A, and side pieces, B and C, formed in the manner described, for the purpose of forming a shoe, substantially as and for the purposes herein set forth.

81,517.—HORSE HAY FORK.—Charles E. Lins, Ashland, Pa.

I claim, 1st, The combination, with the movable jaw, D, of the slide, G, connecting rod, F, and latch, H, arranged and operating in the manner and for the purpose set forth.

2d, The combined arrangement of the stock, A, rigid and hinged jaws, C D, brace, E, rod or brace, F, slide, G, and latch, H, all substantially as described, for the purposes specified.

81,518.—CHURN.—Deloss L. Main, Brooklyn, Mich.

I claim the combination of the churn, A, dasher shaft, B, perforated wings, D, crank, E, bearing, F, standard, G, driving wheel, H, pinion, I, crank wheel, J, connecting rod, K and hand crank, L, when constructed, arranged and operating substantially as and for the purposes herein set forth.

81,519.—CREAM SAVER.—S. E. Mallett, Corry, Pa.

I claim the cream saver, A, constructed and operating substantially as and for the purposes herein described, with or without openings, o.

81,520.—COMPOSITION FOR GRINDING AND POLISHING MARBLE AND OTHER SUBSTANCES.—J. C. McAfee, West Alexander, Pa.

I claim the composition above described, substantially as and for the purpose set forth.

81,521.—FARM GATE.—William McGuire, Chess Springs, Pa.

I claim the paling, D, provided with the slot, E, in combination with the bolt or pivot, f, and nut, f', substantially as and for the purpose herein specified.

81,522.—STONE CUTTING MACHINE.—David H. Merriam, Fitchburg, Mass.

I claim the cutter cylinder provided with cutters and apertures, and supplied with water or steam, for dressing stone or other material, substantially as described.

81,523.—LATHE CHUCK.—Joseph S. Moody, Saco, Me. Antedated July 23, 1868.

I claim, 1st, The gear hub, A, and gear, B, having the set screw, E, to play in the groove, F, to operate as herein set forth, and for the described purposes.

2d, The arrangement of the scales, 8, 10, 12, on the face plate, as and for the purposes set forth.

3d, The combination with the center shaft or gear hub, A, when operated as herein set forth, the knob, D, or its equivalent, as and for the purposes specified.

4th, The combination and arrangement of a universal chuck with a chuck for eccentrics, when constructed substantially as shown and described.

81,524.—GAS BURNER.—George Mooney, Providence, R. I., assignor to himself, James Shaw, Jr., and Job Arnold.

I claim, 1st, In an argand gas burner, a beveled tip, drilled or punched at right angles with its face, substantially as described.

2d, The combination of the base, A, provided with shoulders, A A, and adjustable check, C C, with or without the grooves, C C C, with the surbase, B, and stop screw, B B, constructed and arranged to operate substantially as herein shown and described, for the purpose set forth.

3d, A chimney holder for an argand gas burner, with the peculiar construction of the outer edge, with the modifications thereof as described, for the purposes specified.

81,525.—SAW.—George B. Montgomery, Winslow, Ind.

I claim the combination of the teeth, a b c, the tooth c, being shorter than the teeth, a and b, and formed with the peculiar curved point, and all the different formed teeth being alternately arranged as herein shown and described.

81,526.—GRINDING MILL.—John A. Montgomery, Crawford, N. J. Antedated Aug. 15, 1868.

I claim a grinding mill consisting of the shell, A, and runner, K, provided with shafts, H and M, pinions, E and F, and crank, G, for the purpose of imparting to said runner a reciprocating rotary motion, as shown and described.

81,527.—THILL COUPLING.—Eli M. Morrison and James K. Ross, Noblesville, Ind.

We claim the eccentrically shaped thill iron, E, in combination with the carriage clip, A, rubber packing, C, and bolt, D, constructed as described, and operating substantially as and for the purposes herein set forth.

81,528.—MANUFACTURE OF SHEET IRON.—Edward B. Nock (assignor to O. B. Perdue, Chas. F. Mathews, and John Long), Cleveland, Ohio.

I claim the application of tin to the surface of the iron, by either of the methods herein described, substantially as and for the purpose set forth.

81,529.—REVERSIBLE KNOB LATCH.—W. A. C. Oaks (assignor to W. M. Griscom), Reading, Pa.

I claim, 1st, The follower, E, or its arms, c c', constructed substantially as described, in combination with the steps, e, on the yoke projections, f f', or their equivalents, arranged in such manner as that the back movement of the latch bolt is effected for a given distance only by the follower, and so restricted by the gear of the follower with the bolt or yoke, without, however preventing the bolt from being moved further back by direct application of force to it, essentially as herein set forth.

2d, So constructing the follower arms and bolt or yoke, against which they act to draw back the bolt, as that when the latter is pushed back beyond its unlatching position, as described, and the follower slightly further turned, said arm or arms are disengaged from gear with the bolt or its yoke, to allow of the protrusion of the bolt sufficiently beyond the front edge of the case to admit of its reversal, substantially as specified.

81,530.—TOOL EXTRACTOR FOR WELLS.—Thomas M. Patterson, Tarr Farm, Pa.

I claim the within described apparatus for grappling tools, consisting substantially of the hollow die or screw socket, a, in combination with the iron poles, c c, when said die socket and poles are provided with and connected by means of left-hand screw threads, or threads cut in an opposite direction from the threads upon the tools, substantially as and for the purpose herein set forth.

81,531.—FLOOR CLAMP.—George B. Perkins, Utica, N. Y.

I claim a clamp for laying matched boards, consisting of the lever, A, dog B, groove, C, and brace, E, all constructed to operate substantially as described.

81,532.—WELL CURBING.—C. W. Perry, Providence, R. I.

I claim in the construction of wells, the combination and arrangement of a series of tubes or cases, sliding within each other, capable of extension and contraction, when applied in the manner and for the purposes specified.

81,533.—HERNIA PAD.—William Pomeroy, Brooklyn, N. Y. Antedated Aug. 15, 1868.

I claim the spring plate B, hinged to the plate, C, and the milled eccentric D, working against the shoulder, E, combined with the pad, A, constructed and operating substantially as herein described.

81,534.—CULINARY VESSEL.—H. Poole, Richmond, Ind.

I claim the steamer, 1, divided into compartments by one or more partitions, in which the boiler is separate from the cooking chambers, and the steam is admitted to the latter with pleasure, as set forth.

81,535.—WATER WHEEL.—Frederick Post, Plano, Ill.

I claim, 1st, The combination of the major wheel, B, and the minor wheel, F, constructed and operating substantially as and for the purposes specified.

2d, The sleeve, U, in combination with the wheels, B and F, substantially as and for the purposes described.

81,536.—SPRING.—Henry A. V. Post, Cincinnati, Ohio.

I claim, 1st, The pair of folded and interlapped plates, A and B, having the prolonged inner limbs, a" and b", constructed, arranged, and adapted to operate as set forth.

3d, The pair of folded and interlocked plates, A B, adapted to both slide upon and mutually support each other in the described combination with one or more pairs of stationary outer plates, G H.

81,537.—BELT LACER.—Joseph K. Priest and William Earl, Jr., Nashua, N. H.

We claim the combination of the movable jaw, k, with the crossed-lever punch A.

Also, The combination and arrangement of the hook, m, with the crossed-lever punch A.

Also, the arrangement of the hook so as to extend from the piercer.

Also, the combination and arrangement of the rotary knife, n, with the crossed-lever punch.

81,538.—SHIELD FOR CARRIAGE CURTAIN BUTTONHOLES.—W. G. Queal, Otego, N. Y.

I claim the above-described combination of shields, A and B, with flexible or metallic back, attached to the buttonholes of carriage curtains, for their preservation, and for security of fastening, in the manner and for the purpose as substantially set forth and described.

81,539.—ROTATING FAN.—James H. Reynerson, Pleasant Plain, Iowa.

I claim, 1st, The combination of the spring, D, and thumb-screw running through the piece, O, as described.

2d, The arrangement of the support, B, between the main spring, C, and driving wheel, and the general construction of the whole machine, for the uses and purposes described.

81,540.—WOODEN PAVEMENT.—William D. Richardson, Springfield, Ill.

I claim a wooden pavement, constructed of transverse-arching beams, either whole, or the parts of which break joints, and which support the shouldered blocks of described shape, the interstices being filled with concrete, which concrete rests upon the transverse beams, all substantially as described and for the purposes set forth.

81,541.—HAY FORK.—George M. Robinson, New Wilmington, Pa.

I claim the ring, F, formed on the upper end of the slotted center bar, B, in combination with the handle, E, constructed as described, by the side bar, D, being extended and bent over, substantially as herein set forth.

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81,542.—OIL OR SUET CUP.—Bobert Ross, Bethlehem, Pa.
I claim an oil cup, constructed and operating as herein set forth.

81,543.—STEAM GENERATOR.—J. Q. A. Sargent, Manchester, N. H.
I claim a boiler, constructed and arranged substantially as herein set forth.

81,544.—MODE OF CONNECTING THE DRAFT LEVER TO HORSE-POWER MACHINES.—Henry Shaw, New Orleans, La.
I claim the springs, d e, in combination with the lever, B, when the latter is pivoted to the driving wheel, A, and the several parts are arranged, constructed, and conjointly operated, substantially as herein described, for the purpose set forth.

81,545.—CARRIAGE WHEEL.—Jacob T. Shimer, Easton, Pa.
I claim the combination of the wrought iron spokes, B B, threaded at each end, with the cast iron hub, A, having screw thread perforations, and the wooden rim, C angular plates, c, and screws, d, all arranged together in the manner set forth.

81,546.—SPIKE MACHINE.—William Hamilton Schoenberger, Cincinnati, Ohio.
I claim, 1st, The herein-described series of dies, a', cutters, a b, and headers, k, all arranged, relatively to the other parts of the machine, substantially as shown, and adapted to make more than one spike at each operation from a single bar or rod.
2d, The arrangement, in the cutter head, B, of the head block, K, headers, k k, and cutters, b b, substantially in the manner set forth.
3d, The arrangement of the sliding block, U, links, w w, head, V, ejecting rods, x x x, lever, W, and cam, X, as described.

82,547.—GRAIN DRILL.—Jacob H. Shreiner, Camp Hill, Pa.
I claim the combination and arrangement of the boot, A, with the contractor, B, and distributer, C, when said distributer is sustained in position, substantially as shown and described.

81,548.—SEED PLANTER.—T. H. Smith, Clyde, N. Y.
I claim, 1st, The combination of frame, A, wheels, B, gear wheels, H I, hand wheel, K, wheel, M shaft, M, wheels, M2 M2, and markers, P P, all arranged and operating substantially as and for the purpose set forth.
2d, The seed boxes, 1 Cl, in combination with the slides N, rods, N', and cams, constructed, arranged, and operating as described.
3d, The regulating hand-wheel, K, and wheel, M1, in combination with the shaft, M, wheels, M2 M2, and markers, P P, arranged and operating in the manner and for the purpose explained.

81,549.—SNOW SHOVEL.—John P. Spangle, Canandaigua, assignor to himself and Chauncey Spear, Hopewell, N. Y.
I claim a snow shovel composed of the blade, A, provided with the upturned rear end, a, and marginal beads, a1 a2, the handle, B, ball, C, and bracket, D, substantially as described for the purposes set forth.

81,550.—TIRE BENDER.—T. M. Stansbury, and A. F. Stansbury, Canton, Ill.
We claim the arrangement herein described and shown of the devices, viz, the posts, d d, rollers, e and c, lever, h, spring, i, segment ratchet bar, k, and frame, a, for the uses and purposes herein set forth.

81,551.—CAR COUPLING.—Harvey B. Steele, Winsted, Conn.
I claim the construction of the bumper, A, with its spiral spring, G, head-block, F, with its dog, D, and the dog, E, with its spring, H, all arranged, combined, and operating the square end link, B, as herein described and for the purpose set forth.

81,552.—HALTER.—Christian Adolph Steinbruecke, Louisville, Ill.
I claim, 1st, The buckle, constructed with a plate extending across from one side bar to the other, and forming a portion of the metallic joint, substantially as shown and described.
2d, The metallic joints, constructed as described, and as shown in Fig. 2, in combination with the leather straps composing portions of the halter.
3d, The metallic brace, G, constructed substantially as shown and described.

81,553.—BREAST STRAP SLIDE.—Charles H. Stevens and and Wilson Garrison, Syracuse, N. Y.
We claim the combination of the form, b, inclined ribs, a a, and loops, d, with the detachable pin, C, as herein shown, and for the purpose set forth.

81,554.—MOLD FOR CASTING SLEIGH-SHOES.—Charles Sthore Montano, Iowa, assignor to himself and Levi Heigus.
I claim the flask or metallic mold for casting sleigh-shoes, constructed and arranged as shown and described.

81,555.—POST-HOLE BORER.—Alfred F. Summers, Peoria, Ill., assignor to himself, Chauncey Nve, and Thomas A. Slack.
I claim, 1st, The adjusting slide, B B, and the standards, b b b b, the universal axle, C, containing the spherical nut, the screw, D, the swivel joint, e, and the measuring wheel, H, as described, arranged and operated, in combination with a carriage and auger, substantially in the manner and for the purposes as herein set forth.
2d, The auger, E F, and adjustable concave plate, G, in combination with the swivel joint, e, and screw, D, as described and operating substantially in the manner and for the purposes set forth.
The carriage A a a, as described, in combination with the auger, E F, and its operating devices, substantially in the manner and for the purpose set forth.

81,556.—WASH BOILER.—J. B. Sweetland and Silas T. Fenn, Pontiac, Mich.
We claim the combination of the double bottom, B, pipe, C, spouts, D D, side pipe, E, braces, a a, and rack, F, all constructed as described, and operating substantially as and for the purposes herein set forth.

81,557.—GATE FOR TURBINE WATER-WHEEL.—Leonard S. Swett and James Graham, Vassar, Mich.
We claim a combined gate and guide for water wheels, having gate, E, guide, G, guide plate, A, slots, C, guide pins, D, lugs, c c c c, ratchet, H, cog-wheel, K, and shafts, L and B, constructed, arranged, and operating substantially as specified.

81,558.—FARM GATE.—Lovel F. Tanner, Milan, Ind.
I claim, 1st, The combination of the removable locking-pin, H, with the thrusting braces or struts, E E', studs, G, and gate, A B C, substantially as and for the purposes specified.
2d, The arrangement, substantially as described, of the eyes, I I' perforated rod, J J, staples, k k', and pin, L, for the object explained.

81,559.—LETTER FILE.—A. E. Taylor, New Britain, Conn.
I claim the combination of the bent metal plates, A B, plate, B, being provided with a ratchet slot, d, on each side, and plate, A, provided with a catch, c, for said slot and ratchet, all operating as set forth.

81,560.—BRICK PRESS.—Alfred A. Torpey, Chicago, Ill.
I claim the employment or use of the cams, D E and F, pallets, 4 slide bar, Q, arms, O and P, rock shaft, N, when combined with plates, J, connecting rods, L, and box, K, substantially as and for the purposes set forth.

81,561.—CUPOLA AND BLAST FURNACE.—Charles Truesdale (assignor to himself and William Resor & Co.), Cincinnati, Ohio.
I claim, 1st, A cupola or blast furnace, having its blast formed by a multitudinous number tweers on different levels, and of small individual area, and adapted to deliver a diminished blast upward in the series, substantially as herein described, for the purposes set forth.
2d, A cupola or blast furnace, whose tweers and fire brick-lining are supported upon an iron back or casing composed of staves or sections, F, substantially as set forth.
3d, The mode of fastening the tweers upon the inner surface of the air-chamber by means of a dove-tail or its equivalent.
4th, A tweer, whose inner or discharging end projects beyond the opening which regulates the amount of blast discharged through the same, for the purpose set forth.
5th, A tweer, whose regulating throat or more contracted portion is protected by a prolongation, which inclines more or less downward to the interior of the cupola or furnace, substantially as and for the purpose stated.
6th, The slotted tweer, K, so arranged as to discharge a greater volume below than above, for the purpose set forth.

81,562.—MACHINE FOR PICKING AND CLEANING PEANUTS.—James C. Underwood, Surry Court-House, Va.
I claim a machine having a cylinder, D, provided with rows of teeth, c c c c c, in combination with the fan, C, aprons, L and M, and cap, N, substantially in the manner and for the purpose as herein described.

81,563.—CASTING CHAINS.—C. C. E. Van Alstine, New Haven, Conn.
I claim the herein described process for casting metallic chains, by the employment of a four part flask, A B C D, with mold boards E F G H, upon which the pattern is arranged, in the manner specified.

81,564.—COMPOSITION FOR PAVEMENT.—Edouard Wenger (assignor to himself and Joseph Martishang), Richmond, Ind.
I claim, 1st, Compounding an asphaltic composition with the materials above described, in the manner and with the proportions set forth.
2d, Laying the same on a foundation of gravel and lime.

81,565.—PUMP PISTON.—J. D. Westcott, Waterford, Pa.
I claim the hollow piston head, C, enclosing the induction opening, b, in all positions, and the cup-shaped stops, B B, acting in connection therewith, the whole arranged as described, and operating in the manner and for the purpose specified.

81,566.—STEAM GENERATOR.—S. Lloyd Wiegand (assignor to Walter J. Budd), Philadelphia, Pa. Antedated August 13, 1868.
I claim, 1st, A steam generator, constructed with double tubes in several sections, when the steam and water connections thereof are both applied to the upper vessel or tank C.
2d, The arrangement of the sections, so constructed that the tubes will constantly intercept and break the currents of flame and gas passing to the flue, in combination with the furnace, A, and a chamber below the lower ends of the tubes.
3d, The furnace, either entirely or partially projecting beyond the steam generator, in combination with the chamber below the tubes B
4th, The perforated plates, with conical depressions around the tubes, in combination with the tubes and tanks G.
5th, A steam generator, constructed substantially as shown and described, in combination with a furnace, having the regulatable apparatus for admitting and heating air above the fuel, and with the chamber below the tubes, substantially as shown and described.
6th, The hand-hole plate, constructed substantially as described.

81,567.—GRAIN SCREEN.—J. H. H. Wisehart, Shawneetown, Ill.
I claim, 1st, The arrangement of the sieve, L, with the hopper, C, conveyer, D, and screen, B, substantially as described.
2d, The arrangement of the hopper, C, sieve, I, screw conveyer D, screen, B, incline, J, and spouts, E and F, substantially as described.

81,568.—CAR BRAKE.—T. C Woods, Marion county, Ky.
I claim the brakes, D, constructed as described, when connected by the bar, L, and held in place by the bolts, T, and spring, W, and when operated and applied by the arrangement of catches and disengaging apparatus all substantially as and for the purpose set forth.

81,569.—HARVESTER.—George W. N. Yost (assignor to Corry Machine Company), Corry, Pa.
I claim the support bolt, I, when used to fasten together the cases, A and A', forming the body, and also to support the gudgeon box of the bevel pinion shaft, N, within the body as described, for grass and grain-cutting machines.

81,570.—POTATO SLICER.—Charles B. King, Gallatin, Tenn.
I claim the gate frame, E, when the same is provided with a knife, F, and gage plate, G, and is used in combination with the table, H, and the whole is so constructed and arranged as to operate substantially as described.

81,571.—PLOW.—Alexander Vail, Henry, Ill.
I claim, 1st, The beam, C, supporting the plow, D, and rigidly secured to the axle, A, in combination with the driver's seat, S, the hinged hounds, E E', and tongue, F, substantially as and for the purpose herein set forth.
2d, The slide, K, arranged to operate in connection with the beam, hounds, and tongue, substantially as and for the purpose described.
3d, The hinged hounds, E E', in combination with a plow suspended from a beam rigidly secured to the axle, substantially as described.
4th The combination of the beam, C, plow, D, hinged hounds, E E', tongue, F, lever, I, axle, A, and driver's seat, S, substantially as and for the purpose described.

REISSUES.

61,796.—PLOW.—Dated February 5, 1867; reissue, 3,094.—James C. Bethea, Blakely, Ga.
I claim, 1st, The post, A, having in combination, the front flange, F, and projection, B, or any equivalent of this projection, which sustains, in front of the vertical part of the post next below it, the holding-down mechanism of the beam.
2d, Making the connection of the plow-beam to the post, A, having the front flange, F, by the stirrup, D, and wedge, E, or equivalents of these two parts, the stirrup of which surrounds the beam and a portion of the metal below it, and has directly in rear of the lower end a portion of the post.
3d, The post, A, having the front flange, F, and projection B, or any equivalent of this projection, which together with the beam, is surrounded by the stirrup, D, and drawn together by the wedge, E, or equivalents of this stirrup and wedge, which hold the beam to the post, as these parts do, without weakening either one.
4th, The post, A, having the front flange, F, and the front and rear projections, B B, or any equivalent of the front projection, which, together with the beam, is surrounded by the stirrup, D, and drawn together by the wedge, E, or equivalents of this stirrup and wedge, which hold the beam to the post in front, while the beam is so held to the rear flange as to prevent the parallelism of the land side of the beam and post being varied.
5th, The combination of the post, A, having the front flange, F, and projection, B, and the stirrup, D, wedge, E, and land-side, G, with its cutting-edge, or an equivalent combination of parts.
6th, The post, A, having the front and rear flanges, F F, and projections, B B, and the beam, C, connected to the projections with the stirrups, D D, and the wedges, E E, or equivalents of these parts, for changing the plow from a right to a left-hand turning one.
7th, The combination of the reversible land-side, G, with the post, A, having the flanges, F F.

16,687.—MARKING SLATES.—Dated February 24, 1857; reissue 3,095.—Henry W. Holly, Brooklyn, N. Y., assignee of John W. Hoard, Providence, R. I.
I claim, 1st, The use of liquid silex in the preparation or manufacture of artificial slates, tablets, blackboards, and other like articles for marking or writing upon.
2d, The combination of an oxide as a drying, anti-deliquescent, and coloring substance, with liquid quartz or silex, as a menstruum in the manufacture of artificial slates, substantially as specified.
3d, An artificial slate or tablet formed by spreading liquid quartz or silex, either separate or mixed with other materials, on a suitable surface or body, of card or sheet form, and, prior to being dried, calendering or rolling the same under pressure, essentially as herein set forth.

72,051.—PROCESS FOR REFINING AND CONVERTING CAST IRON INTO CAST STEEL, AND OTHER COMBINATIONS OF IRON AND CARBON.—Dated Dec. 10, 867; reissue 3,096.—Emile Martin and Pierre E. Martin Paris, France.
We claim the process substantially as herein described, for decarbonizing cast iron, in combination with the process of recharging the molten metal with the recarbonizing or "deoxygenating" material, substantially as and for the purpose specified.

63,647.—CULTIVATOR TEETH.—Dated April 9, 1867; reissue 3,097.—Don Carlos Matteson and Truman P. Williamson, Stockton, Cal.
We claim, 1st, The double pointed adjustable bit, A, attached to the beveled foot of the curved standard, C, substantially as and for the purpose specified.
2d, The oblong blade or share, D, in combination with the bit, A, substantially as described, for the purpose specified.

61,762.—PLOW.—Dated Feb. 5, 1867; reissue 3,098.—M. Richards and J Vandegritt, Princeton, Ill
We claim, 1st, Broadly, the beam, C, pivoted to the brace, B, and arranged to turn substantially as and for the purpose herein specified.
2d. The combination of the beam, C, support and brace, B, landside, A, and moldboard, A', as set forth.
3d, The arm, D, in combination with the beam, C, plugs, h, clamp, F, and moldboard A', as described and set forth.

67,174.—WATER WHEEL.—Dated July 30, 1867; reissue 3,099.—Robert Dunbar, Buffalo, N. Y.
I claim, 1st, A passage or communication formed between the chambers, M and N, outside of the hydrostatic chamber, G, substantially as and for the purpose set forth.
2d, The rim, F, connected with and extending downwardly from the plate K, on a circle of less diameter than the hub of the wheel, so as to form, in combination with the plate, K, and stationary disk E, the lesser annular chamber, G, and, in combination with the hub, the larger annular chamber, J, for the purpose and substantially as described.

67,298.—RUBBER FABRIC.—Dated July 30, 1867; reissue 3,100.—John Haskins, Boston, Mass.
I claim the within described article of perforated rubber as an article of manufacture the same being used as and for the purpose set forth.

36,150.—CIRCULAR SAW MILL.—Dated Aug. 12, 1862; reissue 3,101.—George Place and Charles Place, New York city, assignees of Clark I. Hayes and Martin Newman.
We claim, 1st, In a machine for edging and slitting lumber, where the saw or saws are made adjustable on the mandrel, the combination of said saw or saws with feed rollers, constructed and arranged to operate in the manner and for the purpose specified.
2d, The construction of the saw mandrel and hub, which moves upon it, as described.

68,598.—STEAM GENERATOR.—Dated Sept. 10, 1867; antedated July 19, 1867; reissue 3,102.—Division B.—Henry L. Stuart, New York city, assignee of John F. Boynton, Syracuse, N. Y.
I claim, 1st, The perforated tube, B, within the boiler, or its equivalent, for equalizing the temperature of the steam in the boiler, substantially as described.
2d, In combination with a steam boiler, the automatic heater and feeder, when constructed, arranged, and operating substantially as described.

DESIGNS.

3,161 to 3,163.—FLOOR OILCLOTH.—Chas. T. Meyer, Bergen, N. J., assignor to Edward C. Sampson, New York city. Three patents.
3,164.—BASE OF A STOVE.—T. J. Hodgkins, Jr., Peekskill, N. Y.
3,165 and 3,166.—CARPET PATTERN.—Levi G. Malkin, New York city, assignor to Hartford Carpet Company, Hartford Conn. Two patents.
3,167 and 3,168.—TOP PLATE FOR WATCHES.—Eugene Paulus, Philadelphia, Pa. Two patents.
3,169.—GROUP OF STATUARY.—John Rogers, New York city.
3,170.—PRINTING TYPE.—Edwin C. Ruthven (assignor to Mackeller, Smith & Jordan), Philadelphia, Pa.
3,171.—MATCH BOX.—Rodney L. Smith, Wolcottville, Conn.
3,172 to 3,183.—CARPET PATTERN.—Henry G. Thompson, New York city, assignor to Hartford Carpet Company, Hartford, Conn. Twelve patents.
3,184.—TRADE MARK.—Wm. H. Winslow and Erving Winslow, Boston, Mass.
3,185.—POCKET SUN DIAL.—D. W. Wright, New York city.

EXTENSION NOTICES.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Aug. 15, 1868.

Charles Parham, of Philadelphia, Pa., having petitioned for an extension of the patent granted him on the 21st day of November, 1854, and reissued on the 3d day of November, 1863, for an improvement in "Sewing Machines," it is ordered that said petition be heard at this office on the 2d day of November, next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing. [11] ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Aug. 20, 1868.

George W. Lee, of Winchester, Ohio, having petitioned for an extension of the patent granted him on the 21st day of November, 1854, for an improvement in "Seed Planters," it is ordered that said petition be heard at this office on the 9th day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
11 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Aug. 12, 1868.

Eliza Mascher, of Philadelphia, Pa., administratrix of the estate of John F. Mascher, deceased, having petitioned for an extension of the patent granted the said John F. Mascher the 8th day of March, 1853, for an improvement in "Daguerreotype Cases" (this application having been authorized by act of Congress, approved July 27, 1868), it is ordered that the said petition be heard at this office on the 2d day of November next. Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
11 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Aug. 21, 1868.

Whitten E. Kidd, of New York city, having petitioned for an extension of the patent granted him on the 28th day of November, 1854, and reissued the 13th day of January, 1857, for an improvement in "Molds for Pressing Bonnet Fronts," it is ordered that the said petition be heard at this office on the 9th day of November next. Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
11 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE
WASHINGTON, D. C., Aug. 3, 1868.

Daniel G. Ambler and Halsted H. Hoeg, of Jacksonville, Fla., administrators of the estate of Daniel C. Ambler, deceased, having petitioned for an extension of the patent granted to the said Daniel C. Ambler on the 7th day of November, 1854, for an improvement in "Sewing Machines," it is ordered that said petition be heard at this office on the 2d day of November next. Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
11 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Aug. 21, 1868.

T. J. W. Robertson, of Washington, D. C., having petitioned for an extension of the patent granted him on the 28th day of November, 1854, for an improvement in "Sewing Machines," it is ordered that the said petition be heard at this office on the 9th day of November next. Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
11 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Aug 22, 1868.

James H. Whitney, of Brooklyn, N. Y., administrator of the estate of Theodore E. Weed, deceased, having petitioned for an extension of the patent granted the said Theodore E. Weed on the 28th day of November, 1854, for an improvement in "Sewing Machines," it is ordered that the said petition be heard at this office on the 9th day of November next. Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
11 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., July 22, 1868.

William Porter, of Williamsburg, N. Y., having petitioned for an extension of the patent granted to him on the 24th day of October, 1854, for an improvement in "Securing Lamps to Lanterns," it is ordered that said petition be heard at this office on the 19th day of October next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
9 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., July 29, 1868.

Clara B. Snow, of Independence, Iowa, executrix of the estate of Harvey Snow, deceased, having petitioned for an extension of the patent granted to the said Harvey Snow the 21st day of November, 1854, for an improvement in "Presser-bar for Planing Machines," it is ordered that said petition be heard at this office on the 2d day of November next. Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
9 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., August 3, 1868.

Chesley Jarnagin, of Bean's Station, Tenn., having petitioned for an extension of the patent granted him on the 31st day of October, 1854, for an improvement in "Seats for Wagons," it is ordered that said petition be heard at this office on the 19th day of October next. Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
9 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Aug. 5, 1868.

George Miller, of Providence, R. I., having petitioned for an extension of the patent granted to him on the 7th day of November, 1854, for an improvement in "Leather Banding for Machinery," it is ordered that said petition be heard at this office on the 26th day of October next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
9 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Aug. 11, 1868.

George Crompton, of Worcester, Mass., having petitioned for an extension of the patent granted to him on the 14th day of November 1854, for an improvement in "Looms for Weaving Figured Fabrics," it is ordered that said petition be heard at this office on the 26th day of October next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
9 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Aug. 12, 1868.

John Cram, of Boston, Mass., having petitioned for an extension of the patent granted him on the 28th day of November, 1854, for an improvement in "Towel Stand or Clothes Horse." It is ordered that said petition be heard at this office on the 9th day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
10 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Aug. 13, 1868.

Jacob Swartz, of Philadelphia, Pa., having petitioned for an extension of the patent granted him on the 14th day of November, 1854, reissued on the 5th day of June, 1860, and again reissued in three divisions, numbered 1,313, 1,314, and 1,315, on the 3d day of June, 1862, for an improvement in "Harvesters," it is ordered that this petition be heard at this office on the 2d day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed at this office twenty days before the day of hearing. 10 ELISHA FOOTE, Commissioner of Patents.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

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2,220.—HEATING RAILWAY CARRIAGES.—Willard B. Farwell, New York city. July 14, 1868.

2,231.—TOOL OR CHISEL FOR MORTISING MACHINES.—Otis Adams and James Hatch, San Francisco, Cal. July 15, 1868.

2,243.—HAY AND STRAW CUTTER.—George S. Fisher, Buffalo, N. Y. July 16, 1868.

2,244.—LINKS OR COUPLINGS FOR HARNESS, ETC.—Geo. S. Fisher, Buffalo N. Y. July 16 1868.

2,260.—SHUTTLE.—Thomas Hatch, Lawrence, Mass. July 18, 1868.

2,268.—PROPELLING MACHINERY FOR CANAL BOATS AND OTHER VESSELS.—Frederick R. Pike, New York city. July 18, 1868.

2,327.—TEETH FOR MACHINES FOR PICKING OR SEPARATING COTTON, ETC.—Robert Wilde and Charles Schofield, Philadelphia, Pa. July 24, 1868.

2,434.—BINDING FOR SKIRTS.—Thomas de Forest, Birmingham, Conn. August 1, 1868.

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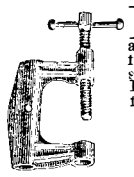

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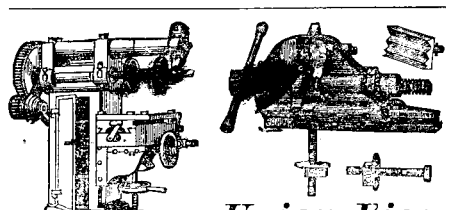

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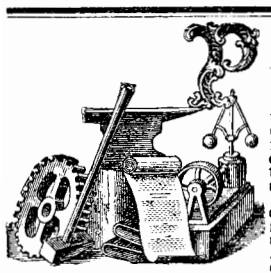

PATENTS

The First Inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

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The model should be neatly made of any suitable materials, strongly fastened, without glue, and neatly painted. The name of the inventor should be engraved or painted upon it. When the invention consists of an improvement upon some other machine, a full working model of the whole machine will not be necessary. But the model must be sufficiently perfect to show, with clearness, the nature and operation of the improvement.

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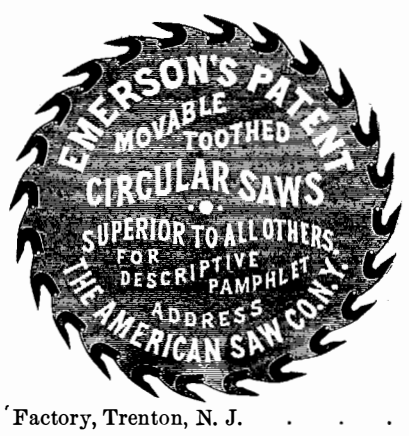

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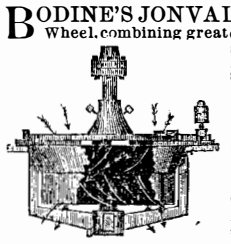

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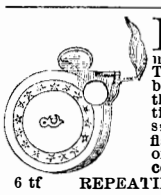

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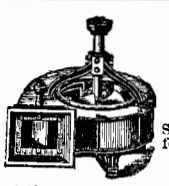

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